UTAH STATE IMPLEMENTATION PLAN

SECTION IX, PART A

FINE PARTICULATE MATTER (PM_{10})

Adopted by the Air Quality Board
February 5, 1997

TABLE OF CONTENTS

IX.A.1 AREA DESIGNATION BACKGROUND 1

IX.A.2 PM_{10} CONCENTRATIONS 2

IX.A.3 UTAH COUNTY 3
- IX.A.3.a. Ambient Data 3
- IX.A.3.b. Design Value Determination 4
- IX.A.3.c. Source Apportionment Methodology 7
- IX.A.3.d. MONITORING SITE SOURCE APPORTIONMENT AND ATTAINMENT DEMONSTRATION 12

IX.A.4 SALT LAKE COUNTY - MAGNA 21
- IX.A.4.a. Design Value Determination 21
- IX.A.4.b. Source Apportionment 21

IX.A.5 SALT LAKE NONATTAINMENT AREA 22
- IX.A.5.a Ambient Data 22
- IX.A.5.b. Design Value Determination 23
- IX.A.5.c. Source Apportionment Methodology 24
- IX.A.5.d MONITORING SITE SOURCE APPORTIONMENT - NORTH SALT LAKE 31

IX.A.6 CONTROL STRATEGIES 43
- IX.A.6.a Magna control strategies. 43
- IX.A.6.b. Utah County industrial control strategies 44
- IX.A.6.c. Salt Lake-Davis industrial control strategies 44
- IX.A.6.d Solid Fuel Burning Devices. 45
- IX.A.6.e. PROVO CANYON CLOSURE TO TRUCK TRAFFIC 48
- IX.A.6.f. DIESEL INSPECTION AND MAINTENANCE PROGRAM AS ADOPTED 49
- IX.A.6.g. ROAD SALTING AND SANDING 49

IX.A.7 MAINTENANCE 50
- IX.A.7.a Population is projected to grow at 1.5% per year. 50
- IX.A.7.b. The vehicle fleet is growing 51
- IX.A.7.c. The number of vehicle miles traveled 51
- IX.A.7.d. The Utah Department of Transportation 53
- IX.A.7.e. EPA has promulgated federal standards for diesel fuel. 53
- IX.A.7.f. EPA has promulgated a federal emission standard for diesel transit 53

IX.A.7.g. Commercial growth 53
IX.A.7.h. Projected industrial growth is unknown. 53

IX.A.8 CONTINGENCY MEASURES 54
IX.A.8.a. Attainment Date 54
IX.A.8.b. Contingency Measures 55
IX.A.8.c. Effectiveness and Implementation Schedules 56

IX.A.9 ANNUAL AVERAGE 61

APPENDICES

App. 1 Letter from Davis County Commissioners, July 11, 1994 65
App. 2 Letter from salt Lake County Commissioners, July 26, 1994 67

List of Tables

IX.A.1 Distribution of Exceedences 2
IX.A.2 Look - up Table 5
IX.A.3 Emissions inventory - Utah County 10
IX.A.4 Control strategy Worksheet - Lindon 13
IX.A.5 Demonstration of Attainment - Lindon 14
IX.A.6 Control strategy Worksheet - West Orem 16
IX.A.7 Demonstration of Attainment - West Orem 17
IX.A.8 Control Strategy Worksheet - North Provo 19
IX.A.9 Demonstration of Attainment - North Provo 20
IX.A.10 Magna PM10 Monitoring Data 21
IX.A.11 Magna Meteorological Data and Concentrations, Pre-control 22
IX.A.12 Design Values, Salt Lake County 23
IX.A.13 Emissions Inventory - Salt Lake and Davis Counties 25
IX.A.14 Control Strategy Worksheet - North Salt Lake 32
IX.A.15 Design Day Attainment Demonstration - North Salt Lake 33
IX.A.16 Demonstration of Attainment - North Salt Lake 34
IX.A.17 Control Strategy Worksheet - Air Monitoring Center 36
IX.A.18 Design Day Attainment Demonstration - Air Monitoring Center 37
IX.A.19 Demonstration of Attainment - Air Monitoring Center 38
IX.A.20 Control Strategy Worksheet - Salt Lake City 40
IX.A.21 Design Day Attainment Demonstration - Salt Lake City 41
IX.A.22 Demonstration of Attainment - Salt Lake City 42
IX.A.23 Magna Meteorological Data and Concentrations, Post-control 43
IX.A.24 Impact of Control Strategies on the Annual Average - Utah County 62
IX.A.25 Impact of Control Strategies on the Annual Average - Salt Lake County 64

List of Figures

IX.A.1 PM10 Concentrations - Lindon 3
IX.A.2 PM10 Conentrations - North Provo 3
IX.A.3 PM10 Concentrations - West Orem 4
IX.A.4 Geneva Steel Production 5
IX.A.5 Lindon PM10 Concentrations 6
IX.A.6 North Provo PM10 Concentrations 6
IX.A.7 West Orem PM10 Concentrations 6
IX.A.8 Number of Days Over the Standard - Lindon 7
IX.A.9 PM10 Average Concentration - Lindon 7
IX.A.10 Average Iron Concentration on Filters 8
IX.A.11 % Iron in PM10 Samples - Lindon 8
IX.A.12 PM10 Source Apportionment - Lindon 12
IX.A.13 PM10 Source Apportionment - West Orem 15
IX.A.14 PM10 Source Apportionment - North Provo 18
IX.A.15 PM10 Concentration - Magna 21
IX.A.16 PM10 Concentrations - North Salt Lake 22
IX.A.17 PM10 Concentrations - Air Monitoring Center 22
IX.A.18 PM10 Concentrations - Salt Lake 23
IX.A.19 PM10 Source Apportionment - North Salt Lake 32
IX.A.20 PM10 Source Apportionment - Air Monitoring Center 35
IX.A.21 PM10 Source Apportionment - Salt Lake 39
IX.A.22 Vehicular NOx Emissions Growth 52

UTAH STATE IMPLEMENTATION PLAN
SECTION IX, PART A
CONTROL MEASURES FOR AREA AND POINT SOURCES

FINE PARTICULATE MATTER (PM_{10})

IX.A.1 AREA DESIGNATION BACKGROUND

The Wasatch Front Intrastate Air Quality Control Region (AQCR), comprised of Davis, Salt Lake, Utah, and Weber Counties was designated by the Environmental Protection Agency (EPA) as a non-attainment area for total suspended particulate matter (TSP) in accordance with the requirements of Section 107, Clean Air Act as amended August 1977. In 1981, the nonattainment areas were redefined as the actual areas of nonattainment and only those portions of each of the four counties in which monitored and/or modeled data showed that ambient concentrations exceed the National Ambient Air Quality Standard (NAAQS) for TSP were designated as nonattainment areas. In 1983, Davis and Weber Counties were redesignated as attainment areas for TSP.

In 1987, EPA determined that only those particulates with a diameter of ten microns or less (PM_{10}) penetrate into the respiratory tract sufficiently deep to cause a health impact. There are primary and secondary sources of PM_{10}. Primary sources are those which emit PM_{10} directly into the atmosphere from chemical, mechanical, or combustion processes. Secondary PM_{10} particles form from the reactions of SO_2 and NO_x emitted to the atmosphere to form sulfates and nitrates. These secondary sulfates and nitrates are measured at monitoring stations as PM_{10}.

On July 1, 1987, EPA promulgated a new NAAQS for PM_{10} and required the submittal of a State Implementation Plan for those areas not meeting the standards. The 24-Hour NAAQS for PM_{10} is 150 $\mu g/m^3$ and it allows up to three exceedances of the standard in any three-year period. Based on historical TSP data, EPA listed Salt Lake and Utah Counties as Group I areas for PM_{10}, which indicated that there was at least a 95% probability that those areas would exceed the new PM_{10} standard. The remainder of the State was listed as Group III, indicating less than a 20% probability of exceeding the PM_{10} standard.

Monitoring data confirms that Salt Lake and Utah Counties exceed the NAAQS for PM_{10}. The State will continue to evaluate the adequacy of the existing ambient air monitoring network described in "Air Quality Surveillance", Section 4 of the SIP. The program will be updated as necessary, to include any revisions of applicable federal regulations and assure attainment of NAAQS for PM_{10}.

The Clean Air Act Amendments of 1990 redesignated the Salt Lake and Utah County Group I areas as non-attainment areas, and required the submittal of a State Implementation Plan which requires the installation of Reasonable Available Control Measures (RACM) on industrial sources impacting the nonattainment areas, and demonstrates attainment of the standard no later than December 31, 1994.

The design value is the ambient pollutant concentration from which this plan must reduce to meet the NAAQS and may be determined by using the actual observed concentrations in the nonattainment area during a specified period of time. The determination of the design value is dependent on the number of days that ambient PM_{10} data were collected during the three-year period, and the data used must be contained in discreet 12-month periods (i.e., 12, 24, or 36-month periods of data collection). This is discussed in more detail in IX.A.4.b. below.

IX.A.2 PM_{10} CONCENTRATIONS

Ambient monitoring data has confirmed that violations of the NAAQS occur in Salt Lake and Utah Counties. Table IX.A.1 below shows the numbers of exceedances measured in Utah and Salt Lake Counties since 1985. It also shows the months when the exceedances occurred. As can be seen, most of the exceedances occur during the winter months. During the winter, extremely strong temperature inversions develop which trap PM_{10} particles and all other pollutants in a layer near the ground. The exception to this winter scenario is the occasional wind storm which can cause blowing dust. The exceedances which occurred at the Magna monitoring site are examples of this condition.

DISTRIBUTION OF EXCEEDANCES

STATION	YEAR	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
LINDON	85			0	0	0	0	0	0	0	0	0	7	7
LINDON	86	6	0	0	0	0	0	0	0	0	0	0	0	6
LINDON	87	0	0	0	0	0	0	0	0	0	0	0	0	0
LINDON	88	5	5	0	0	0	0	0	0	0	0	0	6	16
LINDON	89	11	7	0	0	0	0	0	0	0	0	0	2	20
LINDON	90	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH PV	86	1	0	0	0	0	0	0	0	0	0	0	0	1
NORTH PV	87	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH PV	88	1	1	0	0	0	0	0	0	0	0	0	0	2
NORTH PV	89	1	0	0	0	0	0	0	0	0	0	0	1	2
NORTH PV	90	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST OREM	88										0	0	3	3
WEST OREM	89	7	6	0	0	0	0	0	0	0	0	0	2	15
WEST OREM	90	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE	87							0	0	0	0	0	0	0
SALT LAKE	88	1	0	0	0	0	0	0	0	1	0	0	1	3
SALT LAKE	89	2	1	0	0	0	0	0	0	0	0	0	0	3
SALT LAKE	90 0	0	0	0	0	0	0	0	0	0	0	0	0	
NORTH SL	85										0	0	1	1
NORTH SL	86	1	0	0	0	1	1	0	0	0	0	0	0	3
NORTH SL	87	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH SL	88	1	1	0	1	1	0	0	0	0	0	0	3	7
NORTH SL	89 3	2	1	0	0	0	0	0	0	0	0	0	0	
NORTH SL	90	0	0	0	0	0	0	0	0	0	0	0	0	0
AMC	89	5	1	0	0	0	0	0	0	0	0	0	1	7
AMC	90	0	0	0	0	0	0	0	0	0	0	0	0	0
MAGNA	85						1	1	1	0	0	0	0	3
MAGNA	86	0	0	0	0	1	0	2	0	0	0	0	0	3
MAGNA	87	0	0	0	1	0	1	0	0	0	0	0	0	2
MAGNA	88	0	0	1	1	0	0	0	0	0	0	0	0	2
MAGNA	89	0	0	0	0	0	0	0	0	0	0	0	0	0

MAGNA	90	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE IX.A.1

Because the violations of the PM_{10} standard in the nonattainment areas are caused by different conditions, and because each of the conditions must be resolved in a different manner, this plan will address the ambient data, design value, and source apportionments for each of the monitoring sites in Utah County nonattainment area, the Magna portion of the Salt Lake nonattainment area, and the remainder of the Salt Lake nonattainment area separately, and then address the control strategies for the entire Wasatch Front. As is demonstrated later in this document, because the exceedances in Salt Lake County are monitored in northern Salt Lake County, and because modeling indicates that sources of PM_{10} and its precursors in Davis County impact the Salt Lake nonattainment area, for purposes of this SIP, controls required in the Salt Lake nonattainment area will be required in Davis County.

IX.A.3 UTAH COUNTY

IX.A.3.a. Ambient Data

Because the exceedances of the PM_{10} standard only occur during winter inversion periods in Utah County, it is appropriate to look at winter seasons to determine the controls which may be necessary to reduce ambient PM_{10} concentrations to levels which are below the standard of 150 µg/m^3.

LINDON

Figure IX.A.1 shows the ambient PM_{10} concentrations measured at the Lindon monitoring station. As shown, the PM_{10} standard is exceeded in Lindon. Data from the most recent 24-month period (April, 1988, through March, 1990) will be used in the determination of the Lindon design value. There are no exceedances in the January-April, 1990 period.

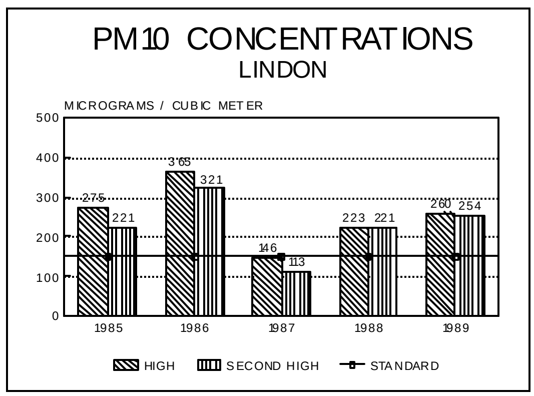


FIGURE IX.A.1

NORTH PROVO

Figure IX.A.2 shows the ambient PM_{10} concentrations which were measured at the North Provo monitoring station. As can be seen, the standard for PM_{10} is exceeded in North Provo. Data from the most recent 24-month period (April, 1988, through March, 1990) will be used in the determination of the design value for the North Provo monitoring site. There are no exceedances in the January-April, 1990 period.

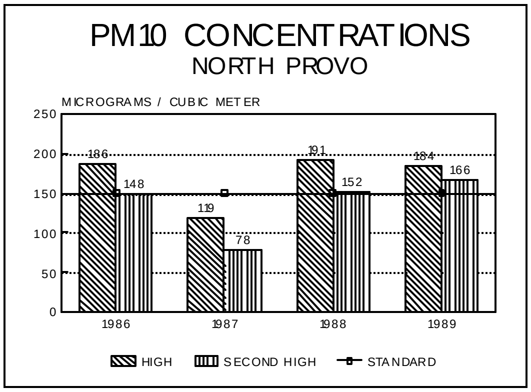


FIGURE IX.A.2

WEST OREM

Collection of PM_{10} data began at the West Orem monitoring site in October of 1988, and a complete year of data has since been collected. Figure IX.A.3 shows a summary of the ambient PM_{10} concentrations which were measured in West Orem. Data from the 12-month period from January through December of 1989 is used to allow the consideration of data from two separate winter seasons in the determination of the design value for West Orem. This will improve the reliability of this plan.

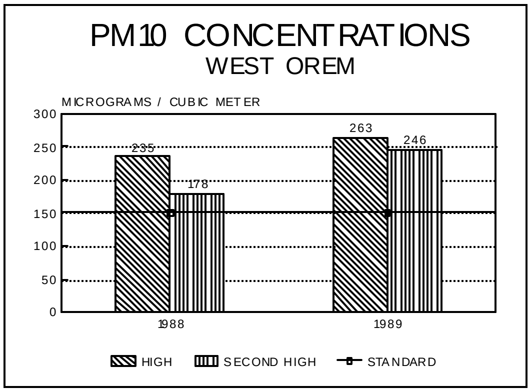


FIGURE IX.A.3

IX.A.3.b. Design Value Determination:

The design value is the PM_{10} concentration that becomes the reference point from which emissions of PM_{10} must be reduced in order to demonstrate attainment of the NAAQS at each monitoring site where violations of the NAAQS occur. As shown above, the Bureau of Air Quality is required to develop an independant design value for each of the monitoring sites in Utah County (i.e., Lindon, North Provo, and West Orem).

Because ambient monitoring data may not be collected each day or may not be collected at the point of highest concentration where the public has access, EPA guidance for PM_{10} SIP preparation normally requires the use of computer modeling to determine the design value. Computer modeling may also be used to verify that the observed pollution levels were the highest which could occur in the area under "worse case" meteorological conditions. If the model indicates that levels higher than those observed might occur, then those modeled values must be used to determine the design value.

One method of determining the design value is the application of dispersion modeling using the emission rates which sources of particulate matter are legally allowed to emit. In many cases the allowed emission rate may be significantly different than the actual emission rate of sources operating normally. Considerable time and effort was spent by the Bureau of Air Quality in calibrating the computer model recommended by EPA to match the monitored data, and modeling the allowed emission rates. The Bureau was allowing wind speeds to approach 0.2 meters per second to simulate winter inversion conditions since violations of the NAAQS routinely occur under such conditions. This technique showed very good agreement between model predictions, chemical mass balance (CMB) source apportionment analysis, and measured ambient PM_{10} concentrations, but the wind speeds which were used were below the EPA modeling requirements of one meter per second. As the process neared completion, EPA determined that the modeling protocol the Bureau was using did not meet the modeling guideline requirements, and EPA required the use of other methods to determine the design value.

EPA's disapproval of the dispersion model made it necessary to use actual measured PM_{10} concentrations to determine the design values. EPA's guidance on determining a design value using measured concentrations requires that the data record used in developing the design value should be a period when point source and area source emission rates are relatively constant and indicative of the usual condition. Since Geneva Steel was closed from August 1986 through September of 1987, and was in a "start-up" mode until March, 1988, the entire data record cannot be used to determine appropriate design values. Geneva Steel is the major Utah County point source of primary PM_{10} particulate and a substantial point source of gaseous sulfur and nitrogen emissions which become secondary PM_{10} particulate. In addition to the concerns presented by the closure of the steel mill, a concern exists that some components of the secondary PM_{10} particles, primarily the nitrates, may have been lost through sublimation from the ambient monitoring filters used to characterize PM_{10} concentrations in the early PM_{10} monitoring efforts. These two concerns dictate that the most recent data be used in determining the design values.

In using the most recent data we must be sure that one of the major sources, Geneva Steel, was operating at their normal capacity in order to have a valid data set. Figure IX.A.4 shows Geneva's production rate since they began operation in September of 1987. As can be seen, the plant was not in full production by December of that year, and discussions with the company have indicated that the plant was in the "start-up" mode until March, 1988; therefore, ambient PM_{10} data collected since April of 1988 can be used in determining the design value.

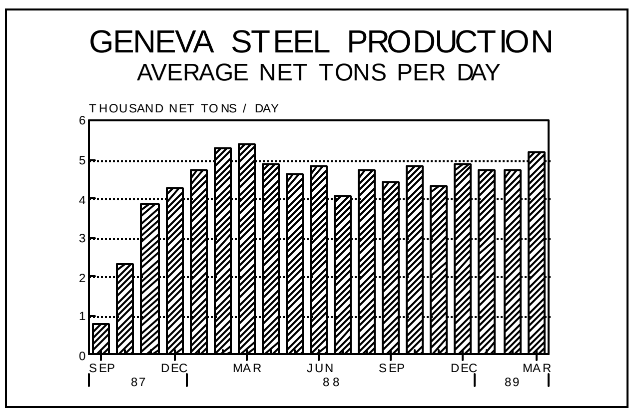


FIGURE IX.A.4

To ensure that each season of the year is represented by the data used in determining the design value, EPA requires the use of complete discrete 12-month data sets or sets which are multiples of 12-month periods.

In using the actual ambient data in determining the design value, the number of days of valid data collected is very important because some days of data may be missing which could have shown a violation of the PM_{10} standard had data been collected for that day. To assist in addressing this problem, EPA's Guideline Document contains a look-up table to be used in determining the design value if ambient monitoring data is used. Table IX.A.2 is a copy of the look-up table.

ESTIMATION OF PM_{10} DESIGN CONCENTRATIONS

NUMBER OF DAILY VALUES	DATA POINT USED FOR DESIGN CONCENTRATION
< 347	Highest Value
348 - 695	Second Highest Value
696 - 1042	Third Highest Value
1043 - 1096	Fourth Highest Value

Table IX.A.2

LINDON

Figure IX.A.5 shows a summary of the PM_{10} data collected at the Lindon monitoring station during the period from April, 1988, through March, 1990. The total number of days of data available during that period is 666 which is in the range of Table IX.A.2 which allows the use of the second highest observed concentration as the design value. The second highest value is 254 µg/m^3 which was measured on February 18, 1989, and is the design value for the Lindon monitor.

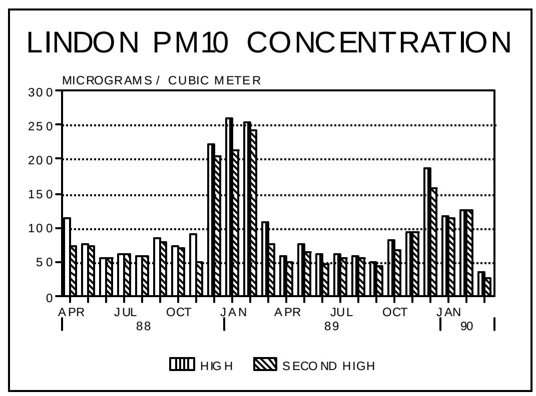


FIGURE IX.A.5

NORTH PROVO

Figure IX.A.6 shows a summary of the PM_{10} data collected at the North Provo monitoring station during the period from April, 1988, through March, 1990. The total number of days of data available during this monitoring period is 226. This number is less than 347 in Table IX.A.2, indicating that the highest value is to be

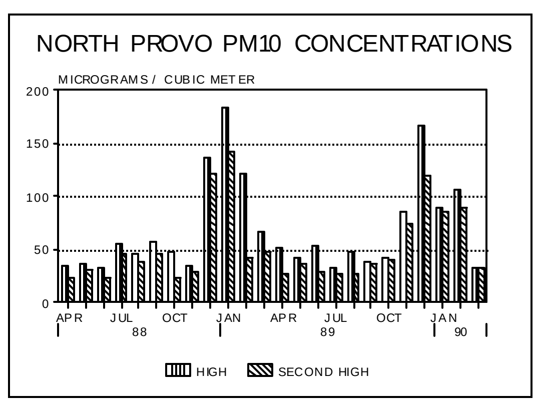


FIGURE IX.A.6

used as the design value. The highest value is 191 µg/m³ which was measured on January 28, 1988, and is the design value for the North Provo monitor.

WEST OREM

PM_{10} Data collection began at West Orem in October, 1988, and a complete year of data has been collected. Figure IX.A.7 shows a summary of the PM_{10} data collected at West Orem from January through December, 1989. The number of days of data that were collected at the West Orem Station during the discrete 12-month period from January 1 through December 31, 1989 is 339, which is in the "less than 347" category in Table IX.A.2 above. Therefore, the highest value should be used as the design value. The highest value at West Orem is 263 µg/m³ which was measured on February 17, 1989 and is the design value for West Orem.

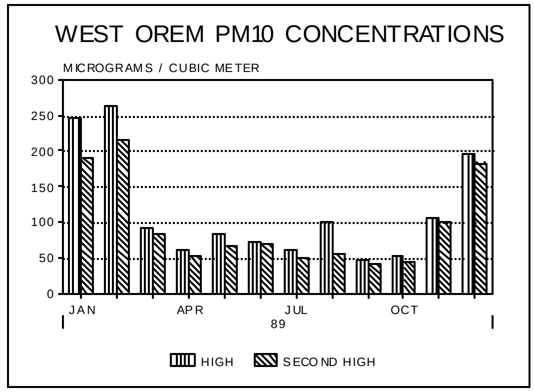


FIGURE IX.A.7

UTAH COUNTY NONATTAINMENT AREA

EPA requires that the highest design value in a PM_{10} nonattainment area be used in determining the amount of reduction that is necessary to attain the standard, and that the plan demonstrate attainment at all monitoring sites on all days which violate the standard. Since 263 µg/m³ is 113 µg/m³ above the standard, a 43% reduction of PM_{10} emissions is necessary in the nonattainment area (i.e., [113/263] x 100) to attain the standard. Knowing the amount of reduction that is needed is essential in determining the control strategies that must be implemented to achieve that reduction.

IX.A.3.c. Source Apportionment Methodology:

UP-DOWN-UP ANALYSIS

A review of the Lindon PM_{10} monitoring data displayed graphically in Figures IX.A.8 and IX.A.9 indicates a major difference in data for the winter of 1986-87. Figure IX.A.8 shows that the number of violations of the standard was significantly less (0 vs. 10-22) and Figure IX.A.9 shows there was also a significant difference in the average concentration of the ten highest measured values (89 µg/m³ vs. 200⁺ µg/m³).

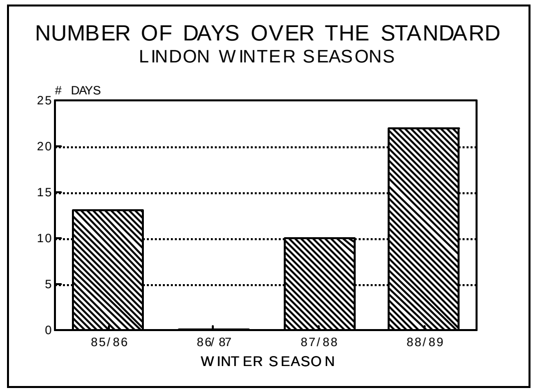


FIGURE IX.A.8

A possible explanation for this difference is that Geneva Steel was closed from August of 1986 through September of 1987. Further analysis of the past four winter seasons shows some interesting comparisons. The average of the ten highest concentrations measured during the winter of 1985-86, when Geneva was operating, was 231 µg/m³. The following winter, 1986-87, when Geneva was closed, the average was 89 µg/m³ which represented a decrease of 61%. The averages of the ten highest concentrations for the winters of 1987-88 and 1988-89, when Geneva was back in operation, were 192 µg/m³ and 220 µg/m³, respectively. This means that within two years of the reopening of Geneva, ambient PM_{10} concentrations had returned to 95% of what they were before the plant closed.

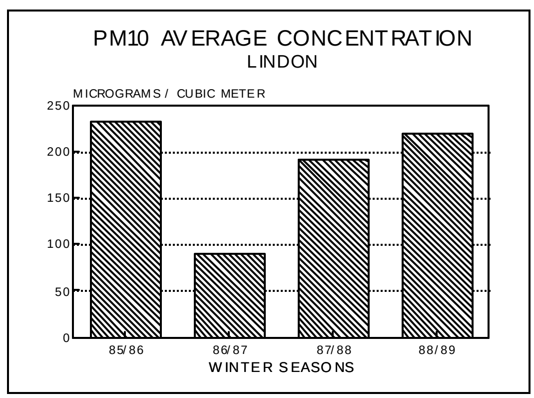


FIGURE IX.A.9

As expected, some of the emissions from a steel mill contain iron. Iron can be used as an indication of a steel mill's impact at a monitoring site. Chemical analysis has been performed on a number of filters from the Lindon monitor. The filters were selected for analysis based on whether they were among the highest values measured and whether filters from other monitoring stations were available to help characterize the polluted air mass. Iron is one of the elements for which the filters were analyzed.

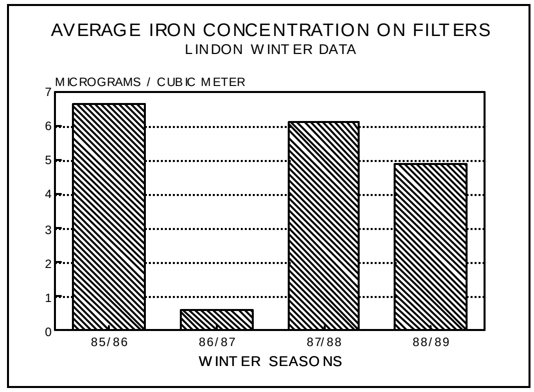


FIGURE IX.A.10

As shown in Figures IX.A.10 and IX.A.11, the average iron concentration from the chemical analysis of filters representing the highest concentrations observed during the winter of 1985-86 is 6.64 µg/m^3 and the average percent concentration of iron in the samples is 2.7.

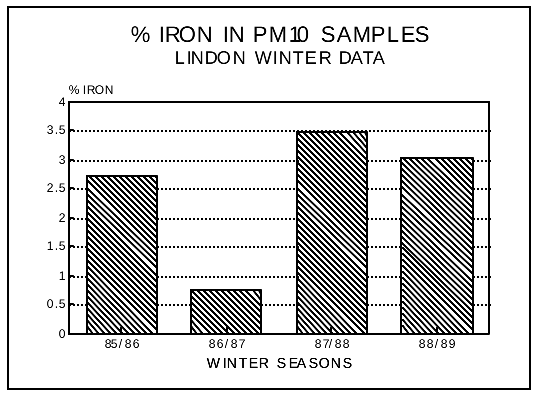


FIGURE IX.A.11

The average of 11 filters analyzed for the winter of 1986-87 is 0.64 µg/m^3 and the average percent iron in the samples is 0.75%. This information indicates that there was a 90% decrease in the iron concentrations and a 72% decrease in the percent concentration of iron in the samples during the period when Geneva was closed.

Since Geneva has resumed operation, the average concentration of iron for the filters which have been analyzed for the winter of 1987-88 is 6.11 µg/m^3 and the average percent concentration of iron in the samples is 3.46. For the winter of 1988-89, the average iron concentration is 4.88 µg/m^3 and the average percent concentration of iron is 3.02. This is a difference of 90% and 87% respectively in iron concentrations and a difference of 78% and 75% in the percent iron in the samples.

In making this analysis, other data has been reviewed to assure that all other conditions remained approximately the same during the period of observation. A review of the meteorological data suggests that the winter of 1986-87 was slightly warmer than normal, which implies that the use of residential solid fuel burners may have been reduced, which would result in a slight overstatement of the contribution of the mill to the ambient concentrations of PM_{10}. Even in view of the warmer winter, this up-down-up review strongly suggests that the impact of the Geneva steel mill at the Lindon monitoring station is greater than 50%. This review also suggests that conditions have not improved over the past two winter seasons. A weakness of this approach is that it is unable to provide information about other sources of PM_{10} in Utah County and the impact that they may have on the Lindon monitor. However, the closure of the steel mill provided the State with an opportunity to determine the relative impact of a major industrial source on ambient PM_{10} concentrations.

CMB APPORTIONMENT

Apportionment of PM_{10} impacts to individual major contributing sources was performed with the Chemical Mass Balance (CMB) receptor model. Two independent receptor modeling techniques were used to gain the most confidence in source apportionment contribution estimates.

The first technique was developed from the data collected when Geneva Steel was not operating. The period when Geneva Steel did not operate provided very valuable data on the chemical make-up of the ambient air without steel plant contamination. When Geneva Steel operated, there is a noticeable difference in the filter chemical "make-up". By methods of subtracting out the influence of the background chemical profiles, a composite Geneva steel profile was developed. The CMB model was performed on this Geneva composite profile and was used as the preliminary technique to apportion Geneva Steel.

The second technique to apportion PM_{10} was to use specific Geneva Steel source profiles collected by NEA, Inc., prior to June, 1989. Geneva Steel hired NEA to collect specific process profiles at Geneva, and to perform source apportionment using this data. The Bureau also performed CMB modeling using these source profiles as a corroborative technique to the first "up/down" CMB modeling method.

Comparisons using the first and second techniques for the winter of 1987/88 shows that the source contribution estimates from Geneva were in close agreement (56% by the up/down method and 50% by using NEA profiles). The up/down technique had about 6% more apportioned to Geneva Steel, because of the differences between the winter when Geneva Steel was not operating (warmer) and when Geneva Steel was operating (colder). The up/down technique is considered to be a level I analysis, which is the easiest and requires the least data. The second technique, using specific Geneva Steel source profiles, is considered a level II analysis. The level II analysis is preferred over a level I analysis. Only the level II analysis was performed for the winter of 1988/89, so no comparisons are available using the up/down technique with the source apportionment contained in this SIP.

A third technique, the development of a micro-inventory, was used to corroborate the first and second techniques and the level II analysis. The micro-inventory shows agreement with the previous techniques, and is contained in the technical support document.

As previously discussed, a dispersion modeling analysis was performed by the Bureau to help reconcile the CMB modeling results with actual emissions and meteorology. A technique was developed by the Bureau to allow for accurate model predictions in light winds. This technique employed use of meteorological data which was more accurate than data available from the National Weather Service. This technique showed very good agreement between model predictions, CMB source contributions and measured ambient PM_{10} concentrations. After long discussions with EPA on this technique, it was finally disapproved by EPA for use in the PM_{10} SIP and, therefore, could not be used in this analysis.

INVENTORY

Table IX.A.3 on the following two pages is a base year inventory for Utah County. To obtain the vehicular emissions, Mobile IV was run in order to obtain a fleet emission factor for both the base year of 1988, and for future years as the fleet turns over with newer "low NO_x" vehicles replacing older "high NO_x" vehicles. NO_x control applied to the control strategy reflects the percentage of decrease in the emission factor relative to the base year factor of 1988 as well as any concurrent changes in vmt or vehicle speed. A detailed mobile source emissions budget is contained in Supplement 1-97 to the technical support document for this PM10 SIP.

U T A H S T A T E D E P A R T M E N T O F H E A L T H

Bureau of Air Quality
Winter of 88/89 Emissions Inventory - Utah County

(1) Area source emissions (Tons/Month)

	PM_{10}	SO_2	NO_x	TOTAL	Winter Month-> Annual Conversion Factor		1988 ACTUAL (Tons/Year)		
A> Vehicular									
Unleaded	3.6	4.9	67.5	75.9					
Leaded	5.8	7.9	109.3	123.1					
Diesel	9.5	24.9	178.2	212.6					
Road Dust	199.7	0.0	0.0	199.7					
Road Sanding	51.2	0.0	0.0	51.2					
Road Salting	0.0	0.0	0.0	0.0					
Break wear	3.7	0.0	0.0	3.7					

Sub-Total	273.6	37.7	355.0	666.3					
B> Space Heating	PM10	SO_2	NOx_x	Total		PM_{10}	SO_2	NO_x	TOTAL
Wood Burning	94.0	1.3	8.8	104.0	0.177	531.1	7.1	49.6	587.8
Coal burning	3.5	13.0	1.7	18.1	0.177	19.5	73.3	9.4	102.2
Natural Gas	3.6	0.5	76.8	80.9	0.177	20.6	2.6	433.8	457.0
Other Heating	0.1	2.2	1.1	3.4	0.177	0.4	12.4	6.4	19.2

Sub-Total	101.2	16.9	88.4	206.4		571.6	95.4	499.2	1,166.2

(2) Major Source Inventory - within 20 kilometers of West Orem

January 1989 monthly inventory 1988 ACTUAL

COMPANY NAME	(Tons/Month)						(Tons/Year)		
	PM_{10}	SO_2	NO_x	TOTAL		PM_{10}	SO_2	NO_x	TOTAL
BYU	6.1	33.8	24.8	64.7		55.4	274.2	205.1	534.7
CON. REDI MIX	2.3	0.2	2.1	4.6		112.2	2.7	25.5	140.4
GEN. REFRACT	2.3	0.3	15.5	18.1		11	3.1	100.5	114.6
GENEVA ROCK	0.2	0.2	1.9	2.3		15.6	7.5	31.3	54.4
HECKETT	9.0	0.3	3.4	12.7		108.1	4.1	41.7	153.9
LA ROCH	2.0	0.0	112.3	114.3		95.7	0	1120	1215.7
LEHI COGEN	0.0	0.0	0.0	0.0		0	0	0	0
PAC. STATES	0.6	0.4	1.3	2.3		15.1	10.7	39.2	65
PROVO CITY	0.9	0.3	6.8	8.0		7.5	2.1	58.7	68.3
REILLY TAR	0.3	0.0	0.9	1.2		0.3	8.6	6.8	15.7
SPRINGVILLE	0.0	0.0	0.5	0.5		0	0	1.3	1.3
UP&L HALE	0.0	0.0	0.0	0.0		0	0	0	0
W.ROCK HLND	0.0	0.0	0.0	0.0		24.9	0.7	7.6	33.2
W.ROCK P. GR	0.1	0.0	0.5	0.6		4.3	0.4	4.5	9.2
GENEVA OTHER	51.0	0.0	0.0	51.0		611.8	0	0	611.8

SUB-TOTAL	74.8	35.5	170.0	280.3		1,061.9	314.1	1,642.2	3,018.2
Geneva Steel	108.3	744.2	407.9	1,260.4	0.0833	1,299.90	8,930.1	4,894.5	15,124.5

Pt Source Total	183.1	779.7	577.9	1,540.7		2,361.8	9,244.2	6,536.7	18,142.7

(3) Grand Totals (Tons/Month) 12/88 -> 2/89

All sources	557.8	834.3	1,021.3	2,413.4
Percent Breakout:				
Vehicular	49.0%	4.5%	34.8%	27.6%
Space Heating	18.1%	2.0%	8.7%	8.6%
Geneva Steel	19.4%	89.2%	39.9%	52.2%
Other Pt sources	13.4%	4.3%	16.6%	11.6%

Sum	100.0%	100.0%	100.0%	100.0%

(4) Composite automobile profile breakout:

Fuel Type	Conditions	% in profile
Leaded	Cold Start	5.5
Leaded	Hot, normal	25.3
Unleaded	Cold start	3.4
Unleaded	Hot, normal	15.6
Diesel	Cold start	9

Diesel	Hot, normal	41.2
Total		100

TABLE IX.A.3 (page 1 of 2)

UTAH STATE DEPARTMENT OF HEALTH
Bureau of Air Quality
Control Strategy Worksheet

Date: 31-Dec-96

INVENTORY DATA TO DEMONSTRATE CONTROL FOR 24 HOUR STANDARD: POST-SIP ALLOWABLE EMISSIONS
Site: Utah County
Date: 14-SEP-90

	Tons Per Year (Annual)			
	PM-10	SOx	NOx	TOTAL
BYU	13.6	217.1	157.3	388.0
CONSOLIDATED RED E MIX	12.60	2.62	24.50	39.72
GENERAL REFRACTORIES	20.6	18.2	95.80	134.6
GENEVA ROCK	43.2	10.2	34.1	87.5
HECKETT	99.50	4.20	43.00	146.70
LA ROCHE	111.0	0.02	228.0	339.02
LEHI COGEN	1.90	6.40	297.00	305.30
PACIFIC STATES	10.4	18.0	63.5	91.9
PROVO CITY	14.50	4.00	254.00	272.50
REILLY TAR	0.51	4.34	13.47	18.32
SPRINGVILLE CITY	1.27	3.18	235.00	239.45
UP&L HALE	11.90	1.40	787.30	800.6
WESTROCK HIGHLAND	13.00	0.70	7.60	21.30
WESTROCK PLEASENT GR	10.3	3.3	31.1	44.7
GENEVA OTHER	766.3	0.0	0.0	766.3
SUBTOTAL:	1,130.58	293.66	2,271.67	3,695.91
GENEVA PROCESSES:				
COKE GAS COMBUSTION	519.5	458.3	0.0	977.8
OPEN HEARTH	222.2	0.0	0.0	222.2
BLAST FURNACE	524.8	0.0	0.0	524.8
SINTER PLANT	75.8	0.0	0.0	75.8
SECONDARY SULFATE	0.0	617.0	0.0	617.0
SECONDARY NITRATE	0.0	0.0	4,251.1	4,251.1
GENEVA SUBTOTAL:	1,342.3	1,075.3	4,251.1	6,668.7

INVENTORIED EMISSIONS FROM 1988:	PM-10	SOx	NOx	TOTAL
	-------	-------	-------	-------
FROM GENEVA:	1,911.7	8,930.1	4,894.5	15,736.3
FROM VEHICLES:	3,282.7	452.2	4,260.5	7,995.4
FROM SPACE HEATING:	571.6	95.4	499.2	1,166.2
FROM OTHER INDUSTRY:	450.1	314.1	1,642.2	2,406.4
TOTALS:	6,216.1	9,791.8	11,296.4	27,304.3

ITEMIZED PERCENTAGES OF REDUCTION:	PM-10	SOx	NOx	TOTAL
	-------	-------	-------	-------
FROM GENEVA:	-10.30%	87.96%	13.15%	52.75%
FROM VEHICLES:	-87.86%	2.44%	34.69%	-17.45%
FROM SPACE HEATING:	48.01%	-23.18%	-23.18%	11.72%
FROM OTHER INDUSTRY:	19.07%	6.51%	-38.33%	-21.74%

PROJECTED ANNUAL EMISSIONS TOTALS:	PM-10	SOx	NOx	TOTAL
	-------	-------	-------	-------
FROM GENEVA:	2,108.6	1,075.3	4,251.1	7,435.0
FROM VEHICLES:	6,167.0	441.1	2,782.7	9,390.9
FROM SPACE HEATING:	297.1	117.5	614.9	1,029.6
FROM OTHER INDUSTRY:	364.3	293.7	2,271.7	2,929.6

TOTALS:	8,937.1	1,927.6	9,920.4	20,785.1

OVERALL PERCENTAGE OF REDUCTION:

EQUALS......((INVENTORIED 1988 TOTAL) - (PROJECTED ANNUAL TOTAL)) / (INVENTORIED 1988 TOTAL)
EQUALS ..... A 23.88% REDUCTION FROM 1988 LEVELS
APPLICATION TO ANNUAL DESIGN VALUE: 54.0 ug/m^3 * (100 - 23.88) / 100 = 41.11 ug/m^3
COMPARISON WITH ANNUAL NATIONAL AMBIENT AIR QUALITY STANDARD: 41.11 ug/m^3 IS LESS THAN 50.0 ug/m^3

Table IX.A.3 (Page 2 of 2)

IX.A.3.d. MONITORING SITE SOURCE APPORTIONMENT AND ATTAINMENT DEMONSTRATION

LINDON

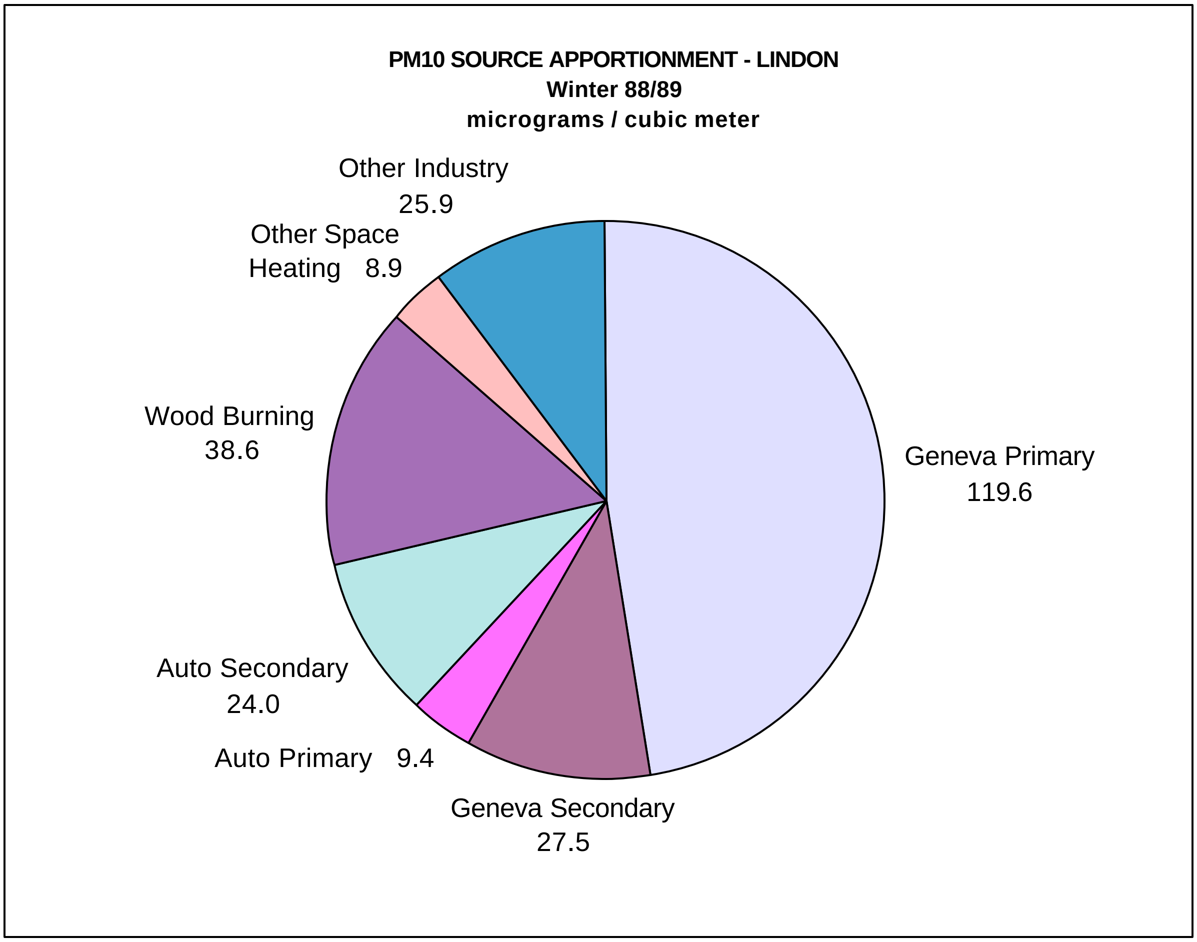


FIGURE IX.A.12

Source Apportionment

Figure IX.A.12 graphically demonstrates the source apportionment data contained on Table IX.A.4 on the following page and shows the contribution which the summarized components made to the overall concentration of PM_{10} at the Lindon monitoring site on February 18, 1989, which is the design day for the Lindon site.

Attainment Demonstration

Tables IX.A.4 and IX.A.5 show how the control strategies will reduce the PM_{10} concentrations at the Lindon site to no greater than 143.1 $\mu g/m^3$ over a nine year period. Mobile IV projections using projected new motor vehicle control program NO_x emission factors indicate there will be ample reduction from the new program to maintain ambient levels below the standard for over ten years. This is the attainment demonstration for the Lindon site.

UTAH STATE DEPARTMENT OF HEALTH
Division of Environmental Health
Bureau of Air Quality
PM10 S.I.P.

Control Strategy Worksheet

Site: Lindon, Utah
Period: Highest days 1988/89
Date: 23-JAN-97
Projection: 2003

Source Catagory	Design Day % Contribution	Impact	Additional Control	Additional Growth	Attainment Impact
(1) Geneva Steel Sub-Total	57.93	147.1	58.7%	0.00%	60.8
Coke Stack	42.15	107.1	74.7%	0.00%	27.1
Open Hearth	4.58	11.6	20.0%	0.00%	9.3
Blast Furnace	0.00	0.0	-46.1%	0.00%	0.0
Sinter Plant	0.35	0.9	43.2%	0.00%	0.5
Secondary Sulfate	0.00	0.0	88.0%	0.00%	0.0
Secondary Nitrate	10.84	27.5	13.1%	0.00%	23.9
(2) Vehicle Sub-Total	13.15	33.4			24.5
Composite Mobile sources	1.82	4.6			
Leaded Gas Fueled	0.56	1.4	64.5%	0.00%	0.5
Diesel Fueled	0.91	2.3	64.5%	0.00%	0.8
Unleaded Gas Fueled	0.35	0.9	64.5%	0.00%	0.3
Re-entrained road dust	0.96	2.4	-99.4%	0.00%	4.8
Road Salting	0.94	2.4	0.0%	0.00%	2.4
Secondary Sulfate	0.00	0.0	2.4%	0.00%	0.0
Secondary Nitrate	9.44	24.0	34.7%	0.00%	15.7
(3) Space Heating Sub-Total	18.71	47.5			30.0
Wood Burning	15.20	38.6	60.0%	23.18%	19.0
Coal Burning	0.56	1.4	0.0%	23.18%	1.7
Gas & Other Heating	0.60	1.5	0.0%	23.18%	1.9
Secondary Sulfate	0.00	0.0	0.0%	23.18%	0.0
Secondary Nitrate	2.35	6.0	0.0%	23.18%	7.3
(4) Other Point sources Sub-Total	10.21	25.9			27.7
B.Y.U. Power	0.46	1.2	75.5%	0.0%	0.3
Heckett	0.68	1.7	8.0%	0.0%	1.6
La-Roche Industries	0.15	0.4	-16.0%	0.0%	0.4
U.P.&L. Hale	0.00	0.0	Included In Other Point Source Category		
Other point sources	4.39	11.1	-12.9%	0.0%	12.6
Secondary Sulfate	0.00	0.0	31.1%	0.0%	0.0
Secondary Nitrate	4.52	11.5	-11.3%	0.0%	12.8
Total	100.00	254.0			143.05

Design Value 254 (Micrograms/Cubic Meter)18-Feb-89

Note:

% population growth per year = 1.5%

These figures were then projected out to the year: 2002

TABLE IX.A.4

LINDON MONITORING SITE
DEMONSTRATION OF ATTAINMENT

Source Catagory	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
(1) Geneva Steel Sub-Total	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8

Coke Stack	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Open Heart	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
Blast Furnace	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sinter Plant	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9
(2) Vehicle Sub-Total	21.8	22.3	22.7	23.2	23.6	24.1	24.5	24.5	24.5	24.5	24.5

Composite Mobile sources											
Leaded Gas Fueled	1.2	1.1	0.9	0.8	0.7	0.6	0.5	0.5	0.5	0.5	0.5
Diesel Fueled	1.9	1.7	1.5	1.4	1.2	1.0	0.8	0.8	0.8	0.8	0.8
Unleaded Gas Fueled	0.7	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3
Re-entrained road dust	2.6	3.0	3.4	3.7	4.1	4.5	4.8	4.8	4.8	4.8	4.8
Road Salting	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	13.0	13.5	13.9	14.3	14.8	15.2	15.7	15.7	15.7	15.7	15.7
(3) Space Heating Sub-Total	26.2	26.6	27.0	27.4	27.8	28.3	28.7	29.1	29.6	30.0	30.5

Wood Burning	16.6	16.9	17.1	17.4	17.7	17.9	18.2	18.5	18.7	19.0	19.3
Coal Burning	1.5	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.8
Gas & Other Heating	1.6	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.9	1.9	1.9
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.5
(4) Other Pt sources Sub-Total	27.7	27.7	27.7	27.7	27.7	27.7	27.7	27.7	27.7	27.7	27.7

B.Y.U. Power	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Heckett	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
La-Roche Industries	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
U.P.&L. Hale											
Other point sources	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8

Total	136.60	137.44	138.29	139.14	140.00	140.86	141.74	142.17	142.60	143.05	143.50

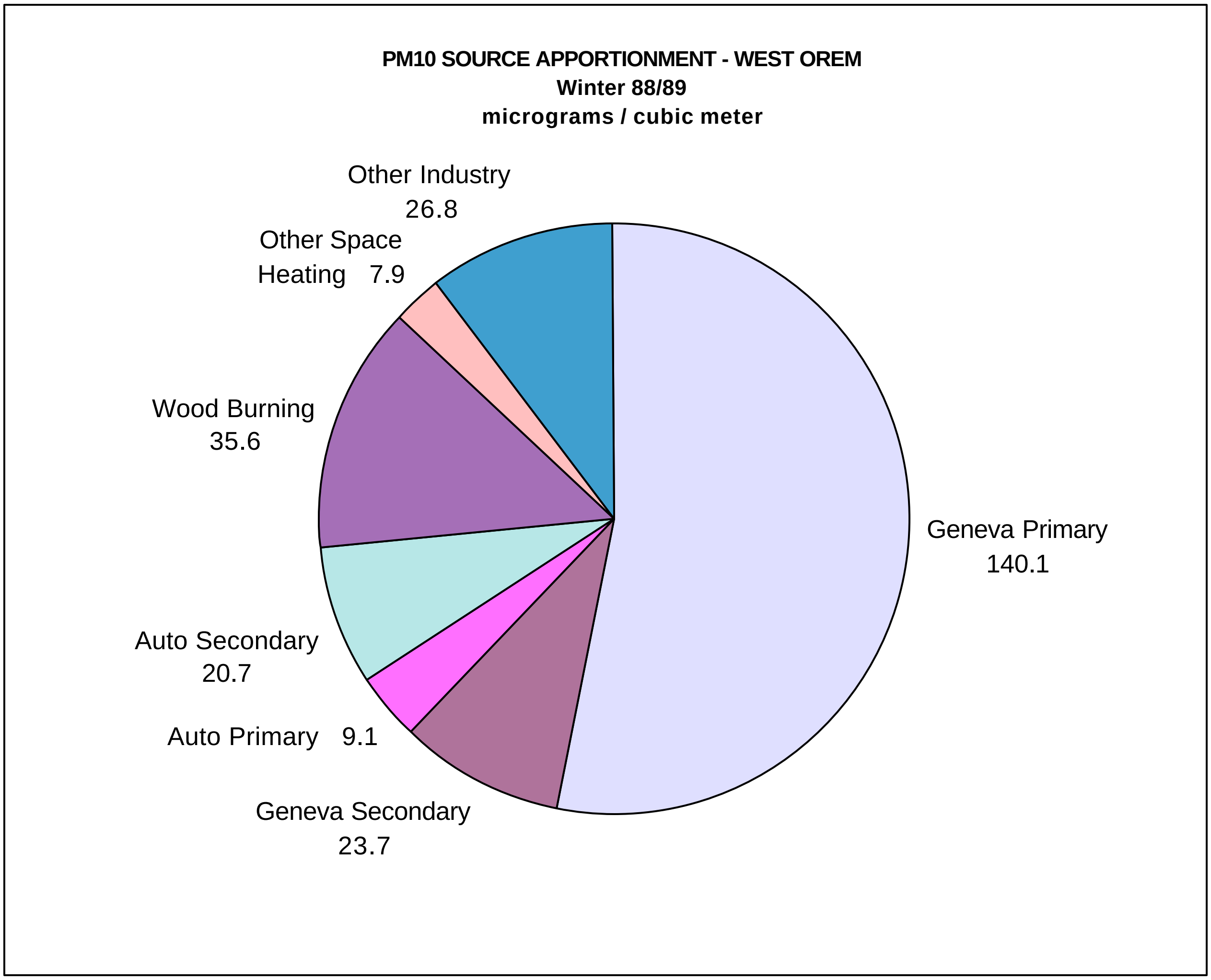


TABLE IX.A.5

WES
T
ORE
M

FIGURE IX.A.13

Source Apportionment

Figure IX.A.13 graphically demonstrates the source apportionment data detailed in Table IX.A.6 on the following page and shows the contribution which the summarized components made to the overall concentration of PM_{10} at the West Orem site.

Attainment Demonstration

Tables IX.A.6 and IX.A.7 show how the control strategies will reduce the PM_{10} concentrations at the West Orem monitoring station to no greater than 146.3 µg/m^3 over a 10 year period. Mobile IV projections using projected new motor vehicle control program NO_x emission factors indicate there will be ample reduction from the new program to maintain ambient levels below the standard for over ten years. This is the attainment demonstration for the West Orem monitoring site.

UTAH STATE DEPARTMENT OF HEALTH
Division of Environmental Health
Bureau of Air Quality
PM10 S.I.P.

Control Strategy Worksheet

Site: West Orem, Utah
Period: Highest days 1989
Date: 23-JAN-97
Projection: 2003

Source Catagory	Design Day % Contribution	Impact	Additional Control	Additional Growth	Attainment Impact
(1) Geneva Steel Sub-Total	62.08	163.8	57.4%	0.00%	69.9

Coke Stack	43.43	114.6	74.7%	0.00%	29.0
Open Hearth	9.44	24.9	20.0%	0.00%	19.9
Blast Furnace	0.00	0.0	-46.1%	0.00%	0.0
Sinter Plant	0.22	0.6	43.2%	0.00%	0.3
Secondary Sulfate	0.00	0.0	88.0%	0.00%	0.0
Secondary Nitrate	9.00	23.7	13.1%	0.00%	20.6
(2) Vehicle Sub-Total	11.29	29.8			20.3

Composite Mobile sources	1.38	3.6			
Leaded Gas Fueled	0.43	1.1	64.5%	0.00%	0.4
Diesel Fueled	0.69	1.8	64.5%	0.00%	0.6
Unleaded Gas Fueled	0.26	0.7	64.5%	0.00%	0.2
Re-entrained road dust	0.00	0.0	-99.4%	0.00%	0.0
Road Salting	2.08	5.5	0.0%	0.00%	5.5
Secondary Sulfate	0.00	0.0	2.4%	0.00%	0.0
Secondary Nitrate	7.83	20.7	34.7%	0.00%	13.5
(3) Space Heating Sub-Total	16.47	43.5			27.6

Wood Burning	13.49	35.6	60.0%	25.02%	17.8
Coal Burning	0.50	1.3	0.0%	25.02%	1.6
Gas & Other Heating	0.53	1.4	0.0%	25.02%	1.8
Secondary Sulfate	0.00	0.0	0.0%	25.02%	0.0
Secondary Nitrate	1.95	5.1	0.0%	25.02%	6.4
(4) Other Point sources Sub-Total	10.16	26.8			28.5

B.Y.U. Power	0.52	1.4	75.5%	0.0%	0.3
Heckett	0.77	2.0	8.0%	0.0%	1.9
La-Roche Industries	0.17	0.5	-16.0%	0.0%	0.5
U.P.&L. Hale	0.00	0.0		Included in other point source catagory	
Other point sources	4.95	13.1	-12.9%	0.0%	14.7
Secondary Sulfate	0.00	0.0	31.1%	0.0%	0.0
Secondary Nitrate	3.75	9.9	-11.3%	0.0%	11.0

Total	100.00	263.9			146.26

Design Value 263.9 (Micrograms/Cubic Meter) 17-Feb-89

Note:

% population growth per year = 1.5%

These figures were then projected out to the year: 2003

TABLE IX.A.6

West Orem Monitoring Site
Demonstration of Attainment

Source Catagory	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
(1) Geneva Steel Sub-Total	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9

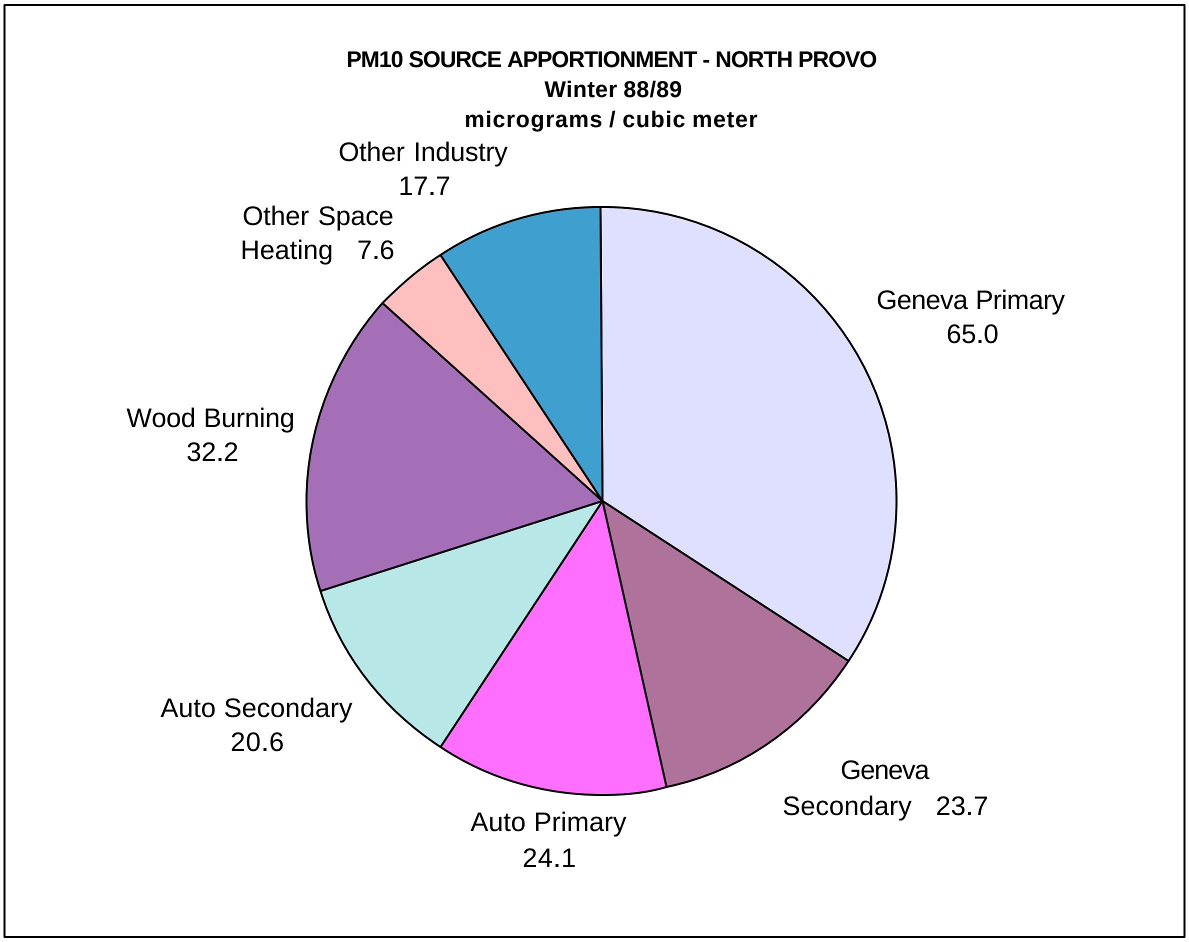
Coke Stack	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
Open Hearth	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Blast Furnace	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sinter Plant	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6
(2) Vehicle Sub-Total	19.7	19.8	19.9	20.0	20.1	20.2	20.3	20.3	20.3	20.3	20.3

Composite Mobile sources											
Leaded Gas Fueled	0.9	0.8	0.7	0.7	0.6	0.5	0.4	0.4	0.4	0.4	0.4
Diesel Fueled	1.5	1.4	1.2	1.1	0.9	0.8	0.6	0.6	0.6	0.6	0.6
Unleaded Gas Fueled	0.6	0.5	0.5	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2
Re-entrained road dust	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Road Salting	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	11.2	11.6	12.0	12.4	12.7	13.1	13.5	13.5	13.5	13.5	13.5
(3) Space Heating Sub-Total	23.8	24.2	24.5	24.9	25.3	25.6	26.0	26.4	26.8	27.2	27.6

Wood Burning	15.3	15.6	15.8	16.0	16.3	16.5	16.8	17.0	17.3	17.5	17.8
Coal Burning	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6
Gas & Other Heating	1.5	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.8
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.1	6.2	6.3	6.4
(4) Other Point sources Sub-Total	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5

B.Y.U. Power	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Heckett	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
La-Roche Industries	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
U.P.&L. Hale											
Other point sources	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0

Total	141.88	142.33	142.78	143.24	143.71	144.18	144.66	145.05	145.45	145.85	146.26



TAB
LE
IX.
A.7

NORTH PROVO

FIGURE IX.A.14

Source Apportionment

Figure IX.A.14 graphically demonstrates the source apportionment data detailed in Table IX.A.8 on the following page and shows the contribution which the summarized components made to the overall concentrations of PM_{10} at the North Provo monitoring site.

Attainment Demonstration

Tables IX.A.8 and IX.A.9 show how the control strategies will reduce the PM_{10} concentrations at the North Provo monitoring station to levels below 150 g/m^3 as they are implemented and maintain an ambient concentration of no greater than 133.5 $\mu g/m^3$ for a ten-year period. This is the attainment demonstration for the North Provo monitoring site.

UTAH STATE DEPARTMENT OF HEALTH
Division of Environmental Health
Bureau of Air Quality
PM10 S.I.P.

Control Strategy Worksheet

Site: North Provo, Utah
Period: Highest days 1988/89/90
Date: 23-JAN-97
Projection: 2003

Source Catagory	Design Day % Contribution	Impact	Additional Control	Additional Growth	Attainment Impact
(1) Geneva Steel Sub-Total	46.45	88.7	49.9%	0.00%	44.4
Coke Stack	26.47	50.6	74.7%	0.00%	12.8
Open Hearth	6.45	12.3	20.0%	0.00%	9.9
Blast Furnace	0.00	0.0	-46.1%	0.00%	0.0
Sinter Plant	1.11	2.1	43.2%	0.00%	1.2
Secondary Sulfate	0.00	0.0	88.0%	0.00%	0.0
Secondary Nitrate	12.42	23.7	13.1%	0.00%	20.6
(2) Vehicle Sub-Total	23.41	44.7			44.3
Composite Mobile sources	3.47	6.6			
Leaded Gas Fueled	1.07	2.0	64.5%	0.00%	0.7
Diesel Fueled	1.74	3.3	64.5%	0.00%	1.2
Unleaded Gas Fueled	0.66	1.3	64.5%	0.00%	0.4
Re-entrained road dust	5.82	11.1	-99.4%	0.00%	22.2
Road Salting	3.32	6.3	0.0%	0.00%	6.3
Secondary Sulfate	0.00	0.0	2.4%	0.00%	0.0
Secondary Nitrate	10.81	20.6	34.7%	0.00%	13.5
(3) Space Heating Sub-Total	20.85	39.8			25.6
Wood Burning	16.87	32.2	60.0%	25.02%	16.1
Coal Burning	0.62	1.2	0.0%	25.02%	1.5
Gas & Other Heating	0.67	1.3	0.0%	25.02%	1.6
Secondary Sulfate	0.00	0.0	0.0%	25.02%	0.0
Secondary Nitrate	2.69	5.1	0.0%	25.02%	6.4
(4) Other Point sources Sub-Total	9.29	17.7			19.1
B.Y.U. Power	0.33	0.6	75.5%	0.0%	0.2
Heckett	0.49	0.9	8.0%	0.0%	0.9
La-Roche Industries	0.11	0.2	-16.0%	0.0%	0.2
U.P.&L. Hale	0.00	0.0	Included In Other Point Source Category		
Other point sources	3.17	6.1	-12.9%	0.0%	6.8
Secondary Sulfate	0.00	0.0	31.1%	0.0%	0.0
Secondary Nitrate	5.18	9.9	-11.3%	0.0%	11.0
Total	100.00	191.0			133.51

Design Value 191 (Micrograms/Cubic Meter)

Note:

% population growth per year = 1.5%

These figures were then projected out to the year: 2003

TABLE IX.A.8

North Provo Monitoring Station
Demonstration of Attainment

Source Catagory	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
(1) Geneva Steel Sub-Total	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4

Coke Stack	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8
Open Hearth	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Blast Furnace	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sinter Plant	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6
(2) Vehicle Sub-Total	35.0	36.6	38.1	39.7	41.2	42.8	44.3	44.3	44.3	44.3	44.3

Composite Mobile sources											
Leaded Gas Fueled	1.7	1.5	1.4	1.2	1.0	0.9	0.7	0.7	0.7	0.7	0.7
Diesel Fueled	2.7	2.5	2.2	2.0	1.7	1.4	1.2	1.2	1.2	1.2	1.2
Unleaded Gas Fueled	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.4	0.4	0.4	0.4
Re-entrained road dust	12.0	13.7	15.4	17.1	18.8	20.5	22.2	22.2	22.2	22.2	22.2
Road Salting	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	11.2	11.6	12.0	12.4	12.7	13.1	13.5	13.5	13.5	13.5	13.5
(3) Space Heating Sub-Total	22.1	22.4	22.7	23.1	23.4	23.8	24.1	24.5	24.9	25.2	25.6

Wood Burning	13.9	14.1	14.3	14.5	14.7	15.0	15.2	15.4	15.6	15.9	16.1
Coal Burning	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.5	1.5
Gas & Other Heating	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.6
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.1	6.2	6.3	6.4
(4) Other Point sources Sub-Total	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1

B.Y.U. Power	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Heckett	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
La-Roche Industries	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
U.P.&L. Hale											
Other point sources	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Secondary Sulfate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secondary Nitrate	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0

Total	120.66	122.54	124.43	126.32	128.22	130.12	132.03	132.39	132.76	133.13	133.51

Table IX.A.9

IX.A.4 SALT LAKE COUNTY - MAGNA

Figure IX.A.15 shows the ambient PM_{10} concentrations measured at the Magna monitoring station since 1985.

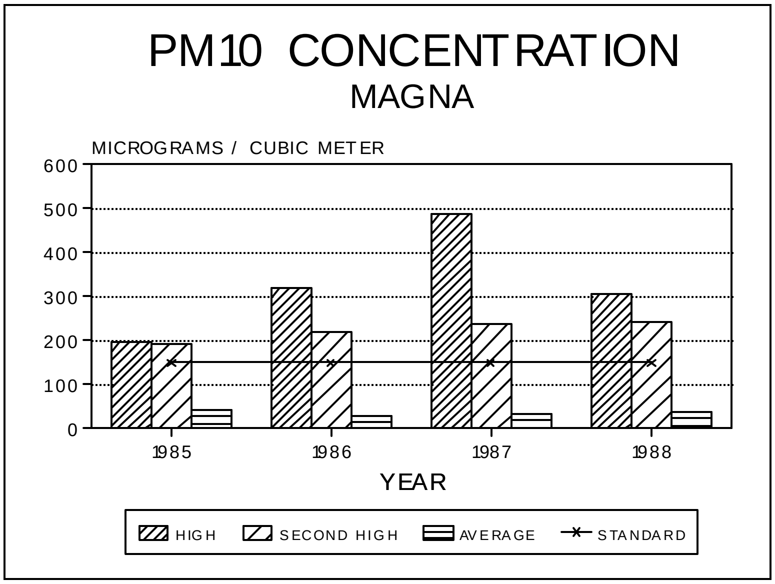


FIGURE IX.A.15

IX.A.4.a. Design Value Determination

Based on the 724 observations in the three year period from 1987 through 1989, the look-up table contained in Table IX.A.2, the data in Table IX.A.10 below indicates that the design value for Magna in Salt Lake County is the third-high reading, or 304 micrograms/meter^3 (µg/m^3) as measured on March 27, 1988.

MAGNA PM_{10} MONITORING DATA

	1989	1988	1987	1986	1985
High 24 Hr. Avg.	107	304	487	320	197
Second High 24 Hr.	105	243	236	219	194
Third High 24 Hr.	103	131	104	179	170
Fourth HIgh 24 Hr.	97	128	99	140	140
Number of days data	78	330	316	314	101

Table IX.A.10

IX.A.4.b. Source Apportionment

The violations of the PM_{10} standard in Magna were caused primarily by the blowing of tailings from the Kennecott tailings pond under certain meteorological conditions while the plant was shut down. This is confirmed by the meteorological data which is summarized in Table IX.A.11 below.

DATE	MEASURED CONCENTRATION	MAXIMUM WIND SPEED (MPH)	WIND DIRECTION (DEGREES)
6-24-85	170	15	308
7-30-85	197	18/11	150/309 WIND SHIFT
8-08-85	194	15/11	
			186/342 WIND SHIFT
5-21-86	179	23	322
7-04-86	320	19	333
7-16-86	219	21/18	150/347 WIND SHIFT
4-18-87	236	25	304
6-22-87	487	21	324
3-27-88	304	20	359
4-07-88	243	23	295

TABLE IX.A.11

IX.A.5 SALT LAKE NONATTAINMENT AREA

IX.A.5.a. Ambient Data

Because the exceedances of the PM_{10} standard only occur during winter inversion periods in Salt Lake and Davis Counties, except in those areas which are impacted by blowing tailings from the Kennecott tailings pond (i.e., Magna), it is appropriate to look at winter seasons to determine the controls which may be necessary to reduce ambient PM_{10} concentrations to levels which are below the standard of 150 µg/m^3.

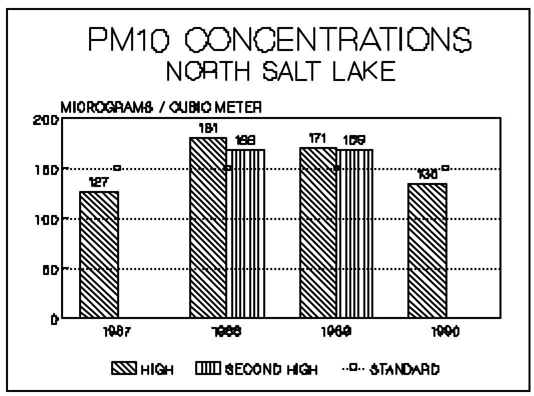


FIGURE IX.A.16

NORTH SALT LAKE

Figure IX.A.16 shows the ambient PM_{10} concentrations measured at the North Salt Lake monitoring station. As shown, the PM_{10} standard is exceeded in North Salt Lake. These data will be used in the determination of the North Salt Lake design value.

AIR MONITORING CENTER (AMC)

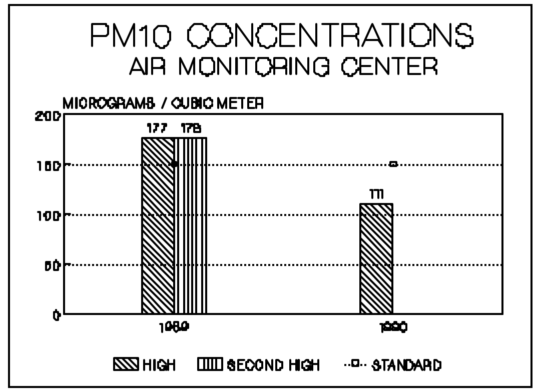


FIGURE IX.A.17

Figure IX.A.17 shows the ambient PM_{10} concentrations which were measured at the Air Monitoring Center in Salt Lake. As can be seen, the standard for PM_{10} is exceeded in Salt Lake City at the AMC. These data will be used in the determination of the design value for the AMC monitoring site.

SALT LAKE

Figure IX.A.18 shows the ambient PM_{10} concentrations which are measured at the Salt Lake monitoring site. As can be seen, the standard for PM_{10} is exceeded in Salt Lake at the Salt Lake Monitoring Site. These data will be used to determine the design value for the Salt Lake monitoring site.

IX.A.5.b. Design Value Determination

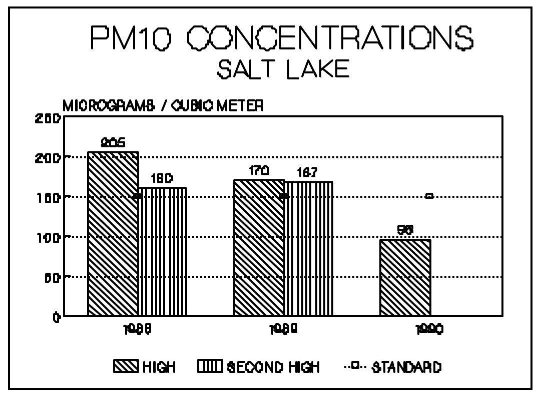


FIGURE IX.A.18

The design value is the PM_{10} concentration that becomes the reference point from which emissions of PM_{10} must be reduced in order to demonstrate attainment of the NAAQS at each monitoring site where violations of the NAAQS occur. As shown above, the Bureau of Air Quality is required to develop an independent design value for each of the monitoring sites in the Salt Lake nonattainment Area where exceedances of the NAAQS have been observed (i.e., the North Salt Lake, the Salt Lake, and the AMC monitoring sites).

EPA's concerns with the performance of dispersion modeling in Salt Lake County made it necessary to use actual measured PM_{10} concentrations to determine the design values. EPA's guidance on determining a design value using measured concentrations requires that the data record used in developing the design value should be a period when point source and area source emission rates are relatively constant and indicative of the usual condition. The design values for the Salt Lake - Davis County nonattainment Area monitoring sites were determined by using the table lookup method. Table IX.A.12 lists the design values for each monitoring site in the Salt Lake - Davis County nonattainment Area. Using Table IX.A.2, the design value for the AMC and the Salt Lake monitoring sites were the highest observerd value. There were more than 900 observations at the North Salt Lake monitoring site which allowed the use of the third highest observed concentration as the design value.

SITE	DESIGN VALUE
AIR MONITORING CENTER	177 µg/m^3
NORTH SALT LAKE	169 µg/m^3
SALT LAKE	170 g/m^3

TABLE IX.A.12

EPA requires that the highest design value in a PM_{10} nonattainment area be used in determining the amount of reduction that is necessary to attain the standard, and that the plan demonstrate attainment at all monitoring sites on all days on which the NAAQS was exceeded but for which the observed concentration was less than the design value for that site. Since the 177 µg/m^3 at the Air Monitoring Center is 27 µg/m^3 above the standard, an 15% reduction of PM_{10} emissions is necessary in the nonattainment area (i.e., [27/177] x 100) to attain the standard. Knowing the amount of reduction that isneeded is essential in determining the control strategies that must be implemented to achieve that reduction.

IX.A.5.c. Source Apportionment Methodology:

The problem of identifying which sources contribute to the PM_{10} violations measured along the Wasatch Front is a complicated one. The problems stem from the fact that a majority of what makes up the particulate measured on the filter is a result of chemical reactions which occur in the atmosphere. These pollutants which undergo chemical reactions are a result of gaseous emissions of sulfur dioxide (SO_2) and nitrogen oxides (NO_x). The gaseous emissions, called precursors, are being controlled as part of the strategy to reduce the excessive particulate measured in Salt Lake and Davis Counties. The problem is compounded by the presence of a large source of secondary PM_{10} emissions, Kennecott, more than 23 miles away on the other side of the valley from the monitors. Kennecott performed a tracer study in February, 1990 to determine if its emissions impact the monitoring sites. That study showed that tall stack and low level emissions do, indeed, impact the monitoring sites. Chemical Mass Balance (CMB) modeling indicates that primary PM_{10} emissions from the smelter contribute as much as 12 g/m^3 at the Air Monitoring Center (on the 2nd high day). With the presence of primary emissions from the smelter, one can expect secondary PM_{10} to impact the monitor also, since the two components undergo similar transport and diffusion. It is assumed in the proposed control strategies adopted with this SIP that emissions from the tall stack impact the group I area.

The procedure of identifying contributing sources, called source apportionment, uses the EPA's latest recommended procedures. These procedures involve the use of two independent techniques for identifying the sources. By having agreement between the two techniques, a more confident source apportionment can be obtained.

The two techniques used involve the use of a receptor model, called the (CMB) model, and a micro-scale emissions inventory. The CMB model uses the chemical makeup of the measured particulate to trace back where the particulate came from. By knowing what the chemical makeup of each potential source is, this method can calculate what percent each source contributes to the particulate problem. The microinventory approach uses the amount of pollutant released by the sources to provide overall source category percent contributions.

Results from the CMB model are the main basis for source apportionment in this SIP. Source contribution estimates from the CMB model for vehicles, woodburning, and industry are compared to similar estimates using the micro-inventory approach. Inconsistencies in the source contributions must be reconciled before the source apportionment is considered adequate. The CMB and micro-inventory approtionment analysis and comparison results are discussed in detail in the Technical Support Document.

A summary of the Salt Lake / Davis County inventory is contained in Table IX.A.13 on the following five pages.

UTAH STATE DEPARTMENT OF HEALTH
Division of Environmental Health
Bureau of Air Quality
PM10 S.I.P
Winter of 88/89 Emissions Inventory - Salt Lake & Davis Counties

(1) Area source emissions (Tons/Month)

	PM_{10}	SO_2	NO_x	TOTAL	Annual-> Winter Month Conversion Factor	1988 ACTUAL (Tons/Year) PM_{10}	SO_2	NO_x	Total
A> Vehicular									
Unleaded	9.3	23.5	262.5	295.3					
Leaded	15.1	38.1	425.5	478.7					
Diesel	51.8	157.6	693.6	903.0					
Roaddust	826.2	0.0	0.0	826.2					
Roadsanding	26.1	0.0	0.0	26.1					
Roadsalt	135.6	0.0	0.0	135.6					
Brake wear	36.7	0.0	0.0	36.7					

Sub-Total	1100.9	219.2	1381.6	2701.7					
B> Other transportation									
Trains	7.4	14.3	93.1	114.8	0.0833	88.4	172.1	1117.1	1377.6
Airplanes	6.8	9.5	79.8	96.0	0.0833	81.4	113.7	957.5	1152.5

Sub-Total	14.2	23.8	172.9	210.8		169.9	285.8	2074.6	2530.2
C> Space Heating									
Wood Burning	334.6	4.5	31.2	370.3	0.18	1890.5	25.2	176.4	2092.1
Coal burning	12.3	46.2	6.0	64.5	0.18	69.5	261.1	33.6	364.2
Natural Gas	17.3	2.2	363.7	383.2	0.18	97.6	12.3	2054.9	2164.8
Res/Comm Oil & Others	4.6	120.0	45.7	170.3	0.18	25.7	677.9	258.3	961.9

Sub-Total	368.7	172.8	446.6	988.2		2083.3	976.5	2523.2	5583.0

(2) Major Source Inventory - Salt Lake and south Davis county

COMPANY NAME	January 1989 monthly inventory (Tons/Month) PM_{10}	SO_2	NO_x	TOTAL
AMOCO	8.9	668.9	33.7	711.5
ASPHALT MATERIALS asphalt plant	0.0	0.0	0.0	0.0
ASPHALT MATERIALS crusher	0.0	0.0	0.0	0.0
BOUNTIFUL CITY POWER	0.0	0.1	1.9	2.0
CENTRAL VALLEY WATER	0.0	0.4	17.6	18.1
CHEVRON	15.2	200.0	98.2	313.4
CPC #2 HOBUSCH 9400 SO. 1100 EAST	0.1	0.0	0.2	0.3
CPC #3 2200 NO. BOUNTIFUL	0.1	0.0	0.2	0.3
CPC WALKER WASATCH BLVD.	0.0	0.0	0.0	0.0
"CPC WHITEHILL PIT, BOUNTIFUL"	1.1	0.0	0.4	1.5
CRYSEN	0.2	0.1	10.6	11.0
FLYING J	1.9	27.6	21.1	50.6
GENEVA ROCK 350 W. 3900 SO.	0.3	0.0	0.1	0.5
GENEVA ROCK PT. OF MT.	3.4	0.0	0.0	3.4
HARPER PIT #1	0.0	0.0	0.0	0.0
HARPER PIT #10	0.0	0.0	0.0	0.0
HARSHAW FILTROL	1.5	1.0	5.0	7.5
HERCULES	26.5	0.1	20.1	46.7
INTERSTATE BRICK	4.5	0.0	0.2	4.7

Table IX.A.13 (page 1 of 6)

(2) Major Source Inventory - Salt Lake and south Davis County (Cont'd)

January 1989 monthly inventory (Tons/Month)

COMPANY NAME	PM_{10}	SO_2	NO_x	TOTAL
KMC BARNEY'S	0.0	0.0	0.0	0.0
KMC BONN CRUSHER	19.9	0.0	0.0	19.9
KMC COPP CONC.	0.2	9.6	1.3	11.1
KMC MINE	275.6	52.0	337.3	664.9
KMC POWER PLANT	19.8	342.0	250.9	612.7
KMC REFINERY	0.9	0.5	3.0	4.4
KMC TALL STACK	42.9	5580.0	0.0	5622.9
KMC LOW LEVEL FUG.	69.1	1004.4	12.0	1085.5
LDS HOSPITAL	0.7	9.6	5.9	16.2
LDS WELFARE SQ.	1.0	0.2	0.2	1.3
LONE STAR	0.0	0.0	0.0	0.0
MONROC BECK ST.	5.0	0.0	0.0	5.0
MONROC COTTONWOOD	0.1	0.0	0.5	0.7
MORTON SALT	2.0	0.0	0.5	2.5
MOUNTAIN BELL	0.0	0.0	0.1	0.1
MOUNTAIN FUEL 100S 180W.	0.2	0.1	5.2	5.5
MOUNTIAN FUEL 100S. 1078 W.	0.1	0.0	2.6	2.8
MURRAY CITY POWER	0.0	0.0	0.5	0.5
OSTLER ROCKY MOUNTAIN	2.1	0.0	0.5	2.6
PARSONS KERNS	0.0	0.0	0.0	0.1
PARSONS WOODSCROSS	0.1	0.0	0.3	0.4
PHILLIPS	10.0	508.6	58.1	576.7
PIONEER SAND & GRAVEL	0.0	0.0	0.0	0.0
SALT LAKE CITY ASPHALT	0.0	0.0	0.0	0.0
SALT LAKE CO. ASPHALT	0.1	0.0	0.1	0.2
SALT LAKE VALLEY SAND & GRAVEL	0.0	0.0	0.0	0.0
SAVAGE ROCK 6200S. 3100EAST	0.0	0.0	0.2	0.2
STAKER BECK ST.	5.8	0.0	0.0	5.8
STAKER DRAPER	0.0	0.0	0.0	0.0
STAKER WEST PIT	0.0	0.0	0.0	0.0
U OF U	27.2	47.0	30.8	105.0
UNION PACIFIC RESOURCES	4.3	0.1	0.6	5.0
UP&L 40N. 100W.	0.1	0.0	2.4	2.5
UP&L GADSBY	0.0	0.0	0.0	0.0
UTAH METAL WORKS	0.6	0.0	0.0	0.7
VA HOSPITAL	0.0	0.0	0.8	0.9
W.W. & W.B. GARDNER	0.8	0.0	0.0	0.8
WOLF EXCAVATING	0.6	0.0	0.4	1.0

Sub-Total	553.2	8452.5	923.6	9929.3
--------------------				

(3) Totals for all catagories	PM_{10}	SO_2	NO_x	Total	Percent Breakout PM_{10}	SO_2	NO_x	Total
A> Vehicular	1100.9	219.2	1381.6	2701.7	54.0	2.5	47.2	19.5
B> Other transportation	14.2	23.8	172.9	210.8	0.7	0.3	5.9	1.5
C> Space Heating	368.7	172.8	446.6	988.2	18.1	1.9	15.3	7.1
D> Point sources	553.2	8452.5	923.6	9929.3	27.2	95.3	31.6	71.9

Grand Totals	2036.9	8868.3	2924.7	13830.0	100.0	100.0	100.0	100.0

Table IX.A.13 (page 2 of 6)

(4) Composite automobile profile breakout:

Fuel Type	Conditions	% in profile
Leaded	Cold Start	5.5
Leaded	Hot, normal	25.3
Unleaded	Cold start	3.4
Unleaded	Hot, normal	15.6
Diesel	Cold start	9.0
Diesel	Hot, normal	41.2
Total		100.0

(5) EXPECTED REDUCTIONS IN VEHICULAR NO_x:

Mobile 4 was run in order to obtain a fleet emission factor for both the base year of 1988, and for future years as the fleet over with newer "low NO_x" vehicles replacing older "high NO_x" vehicles. The following is a listing of the emission fctors predicted by the model. NO_x control applied to the control strategy reflects the percentage of decrease in the emission fa relative to the base year factor of 1988. It should be noted that these emission factors reflect an average speed of 35 miles per hour.

1988	2.33 g/vmt	1994	1.623 g/vmt	2000	1.069 g/vmt
1989	2.19 g/vmt	1995	1.490 g/vmt	2001	0.990 g/vmt
1990	2.07 g/vmt	1996	1.38 g/vmt	2002	0.930 g/vmt
1991	1.93 g/vmt	1997	1.290 g/vmt	2003	0.900 g/vmt
1992	1.809 g/vmt	1998	1.205 g/vmt	2004	0.860 g/vmt
1993	1.72 g/vmt	1999	1.120 g/vmt	2005	0.854 g/vmt

Table IX.A.13 (page 3 of 6)

U T A H   S T A T E   D E P A R T M E N T   O F   H E A L T H

Bureau of Air Quality

Control Strategy Worksheet

Date: 26-AUG-92

INVENTORY DATA TO DEMONSTRATE CONTROL FOR 24 HOUR STANDARD:

POST-SIP ALLOWABLE EMISSIONS

	Tons Per Year (Annual)			
	PM-10	SOx	NOx	TOTAL
AMOCO	113.0	2,357.0	638.0	3,108.0
ASPHALT MATERIALS asphalt plant	2.7	0.1	2.9	5.7
ASPHALT MATERIALS crusher	10.2	0.0	0.0	10.2
BOUNTIFUL CITY POWER	1.1	6.0	250.0	257.1
CENTRAL VALLEY WATER	0.7	4.0	205.6	210.2
CHEVRON	175.0	2,578.2	1,021.6	3,774.8
CPC #2 HOBUSCH 9400 SO. 1100 EAST	33.4	0.9	8.3	42.6
CPC #3 2200 NO. BOUNTIFUL	15.5	0.2	2.0	17.7
CPC WALKER WASATCH BLVD.	34.7	1.3	17.4	53.4
CPC WHITEHILL PIT ORCH DR. BOUNTIFUL	48.0	0.9	9.8	58.7
CRYSEN	2.7	206.0	156.0	364.7
FLYING J	22.0	864.6	278.7	1,165.3
GENEVA ROCK 350 W. 3900 SO.	4.5	0.5	5.3	10.3
GENEVA ROCK PT. OF MT.	81.0	9.6	21.4	112.0
HARPER PIT #1	7.8	1.9	18.4	28.1
HARPER PIT #10	16.3	1.6	17.9	35.8
HARSHAW FILTROL	34.9	31.5	94.5	160.9
HERCULES	318.1	1.5	240.9	560.5
INTERSTATE BRICK	95.9	0.0	46.5	142.4
KMC BARNEY'S	159.5	23.4	216.1	399.0
KMC BONN CONC.	234.1	0.0	0.0	234.1
KMC COPP CONC.	5.0	114.9	20.6	140.5
KMC MINE	2,801.0	78.0	4,048.1	6,927.1
KMC POWER PLANT	257.3	6,219.3	5,085.3	11,561.9
KMC REFINERY	51.9	162.6	121.0	335.5
KMC TALL STACK	876.0	14,191.2	0.0	15,067.2
KMC LOW LEVEL FUG.	464.0	4,383.8	145.0	4,992.8
LDS HOSPITAL	6.2	156.9	74.3	237.3
LDS WELFARE SQ.	11.2	0.5	1.4	13.0
LONE STAR	111.0	200.0	762.0	1,073.0
MONROC BECK ST.	69.5	8.0	17.2	94.7
* MONROC KEARNS	30.2	1.0	12.7	44.0
MORTON SALT	49.1	0.9	18.3	68.3
MOUNTAIN BELL	0.3	0.5	3.9	4.7
MOUNTAIN FUEL 100S 180W.	2.5	1.4	71.1	75.0
MOUNTIAN FUEL 100S. 1078 W.	1.1	0.4	31.2	32.7
MURRAY CITY POWER	1.6	2.4	250.0	254.0
OSTLER ROCKY MOUNTAIN	5.8	0.0	3.8	9.6
PARSONS KERNS	4.9	0.4	4.6	9.9
PARSONS WOODSCROSS	6.9	0.4	4.6	11.9
PHILLIPS	162.0	2,016.0	693.0	2,871.0
PIONEER SAND & GRAVEL	21.8	0.9	9.1	31.8
SALT LAKE CITY ASPHALT	5.3	0.1	5.7	11.1
SALT LAKE CO. ASPHALT	29.3	0.6	12.8	42.7
SALT LAKE VALLEY SAND & GRAVEL	43.9	13.9	21.4	79.2
SAVAGE ROCK 6200S. 3100EAST	28.5	1.2	14.1	43.8

STAKER BECK ST.	54.5	34.6	58.6	147.7

Table IX.A.13 (page 4 of 6)

STAKER DRAPER	13.4	1.1	16.5	31.0
STAKER WEST PIT	13.3	1.1	16.5	30.9
U OF U	74.3	219.3	245.8	539.4
UNION PACIFIC RESOURCES	27.5	1.9	20.5	49.9
UP&L 40N. 100W.	2.0	0.2	54.8	57.0
UP&L GADSBY	61.3	67.7	2,983.0	3,112.0
UTAH METAL WORKS	4.3	0.0	1.0	5.3
VA HOSPITAL	0.5	0.0	9.9	10.4
W.W. & W.B. GARDNER	24.1	6.2	13.0	43.2
WOLF EXCAVATING	3.3	0.3	3.4	7.0
TOTALS:	6,735.7	33,976.8	18,105.3	58,817.8

Table IX.A.13 (page 5 of 6)

U T A H   S T A T E   D E P A R T M E N T   O F   H E A L T H
Division of Environmental Health
Bureau of Air Quality
PM10 S.I.P.
Control Strategy Worksheet

Date: 26-AUG-92

INVENTORIED EMISSIONS FROM 1988:	PM-10	SOx	NOx	TOTAL
	-------	-------	-------	-------
FROM INDUSTRY:	5,619.4	95,702.1	10,967.6	112,289.1
FROM VEHICLES:	13,210.5	2,630.0	16,579.3	32,419.8
FROM SPACE HEATING:	2,083.3	976.5	2,523.2	5,583.0
FROM OTHERS:	169.9	285.8	2,074.6	2,530.2
TOTALS:	21,083.0	99,594.4	32,144.7	152,822.1

ITEMIZED PERCENTAGES OF REDUCTION:	PM-10	SOx	NOx	TOTAL
	-------	-------	-------	-------
FROM INDUSTRY:	-19.87%	64.50%	-65.08%	47.62%
FROM VEHICLES:	-2.15%	43.19%	33.38%	19.70%
FROM SPACE HEATING:	48.70%	-17.79%	-17.79%	7.02%
FROM OTHERS:	0.00%	0.00%	0.00%	0.00%

PROJECTED ANNUAL EMISSIONS TOTALS:	PM-10	SOx	NOx	TOTAL
	-------	-------	-------	-------
FROM INDUSTRY:	6,735.7	33,976.8	18,105.3	58,817.8
FROM VEHICLES:	13,494.7	1,494.0	11,045.7	26,034.3
FROM SPACE HEATING:	1,068.8	1,150.3	2,972.3	5,191.3
FROM OTHERS:	169.9	285.8	2,074.6	2,530.2
TOTALS:	21,469.0	36,906.9	34,197.8	92,573.6

OVERALL PERCENTAGE OF REDUCTION:

EQUALS ......((INVENTORIED 1988 TOTAL) - (PROJECTED ANNUAL TOTAL)) / (INVENTORIED 1988 TOTAL)

EQUALS ..... A 39.42% REDUCTION FROM 1988 LEVELS

APPLICATION TO ANNUAL DESIGN VALUE: 56.0 ug/m^3 * (100 - 39.42) / 100 = 33.92 ug/m^3

COMPARISON WITH ANNUAL NATIONAL AMBIENT AIR QUALITY STANDARD: 33.92 ug/m^3 IS LESS THAN 50.0 ug/m^3

Table IX.A.13 (page 6 of 6)

IX.A.5.d MONITORING SITE SOURCE APPORTIONMENT
NORTH SALT LAKE

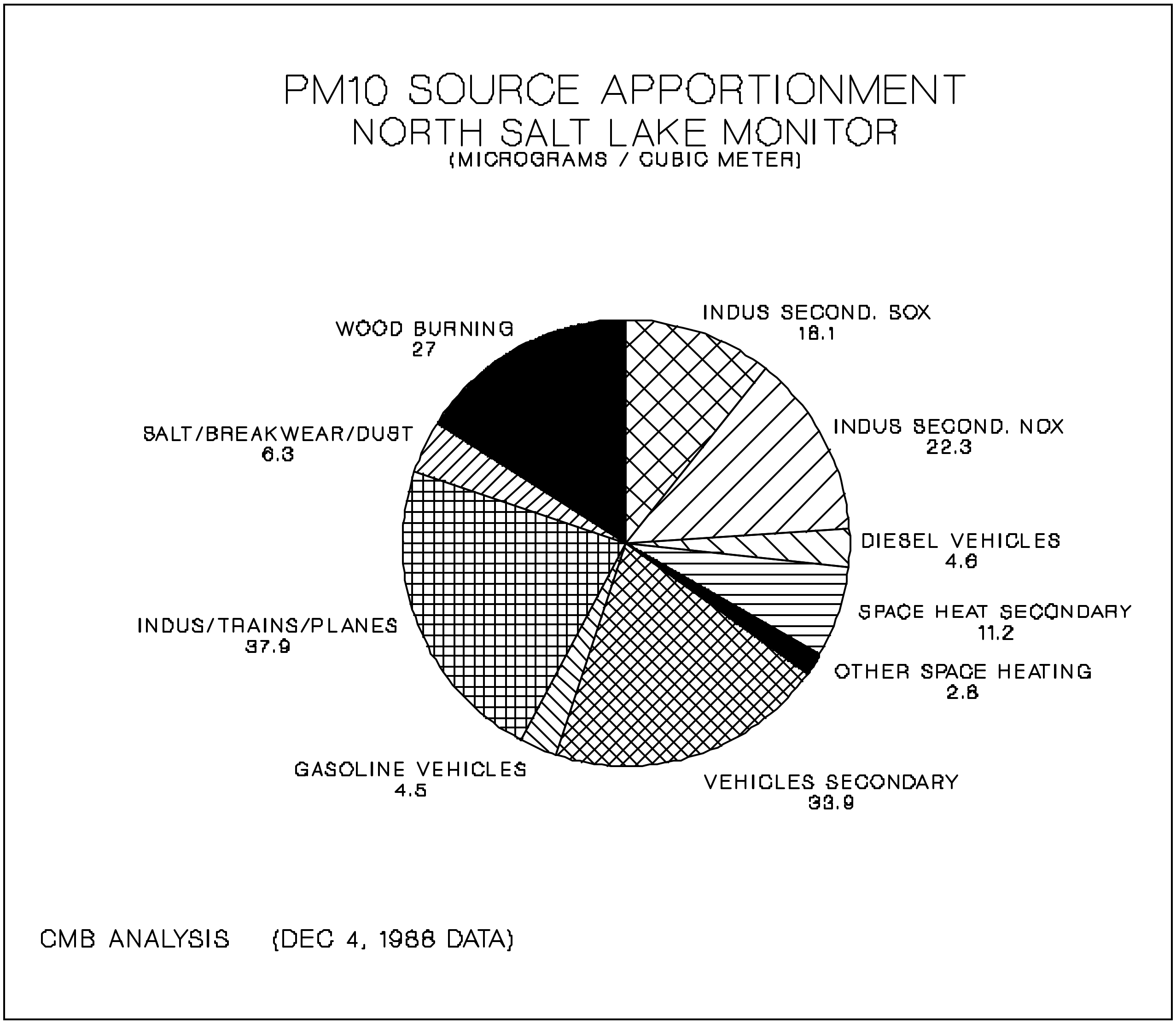


FIGURE IX.A.19

Source Apportionment. Figure IX.A.19 graphically demonstrates the source apportionment data contained on Table IX.A.14 on the following page and shows the contribution which the summarized components made to the overall concentration of PM_{10} at the North Salt Lake monitoring site on December 4, 1988, which is the design day for the North Salt Lake monitoring site.

Attainment Demonstration. Tables IX.A.14, IX.A.15, and IX.A.16 show how the control strategies will reduce the PM_{10} concentrations at the North Salt Lake monitoring site to levels below the 150 g/m^3 standard through calendar year 2003. Mobile IV projections using new motor vehicle control program NO_x emission factors indicate that there will be ample reduction from the new program to maintain ambient levels below the standard for over ten years. This is the attainment demonstration for the North Salt Lake monitoring site.

UTAH STATE DEPARTMENT OF HEALTH
Division of Environmental Health
Bureau of Air Quality
PM10 S.I.P. Control Strategy Worksheet

Site: North Salt Lake Monitor Date: 26-AUG-92
Period: EXCEEDANCE DAYS IN WINTERS 88/89,89/90 Projection: 2001

Source Catagory	Design Day % Contribution	Impact	Additional Control	Additional Growth	Attainment Impact
(1) Major Point sources	42.92	72.3	16.3%	0.00%	60.5

Copper smelter	4.78	8.0	41.2%	0.00%	4.7
Oil refinery cat crackers	3.28	5.5	-15.8%	0.00%	6.4
Other point sources	10.90	18.4	36.4%	0.00%	11.7
Secondary Sulfate	10.73	18.1	60.0%	0.00%	7.2
Secondary Nitrate	13.23	22.3	-36.6%	0.00%	30.5
(2) Vehicle Sub-Total	29.28	49.3			41.2

Composite Mobile sources	5.45	9.2			
Leaded Gas Fueled	1.68	2.8	6.0%	55.80%	4.1
Diesel Fueled	2.74	4.6	23.8%	55.80%	5.5
Unleaded Gas Fueled	1.04	1.7	6.0%	55.80%	2.6
Re-entrained road dust	1.26	2.1	0.6%	0.00%	2.1
Road Salting	0.00	0.0	0.0%	0.00%	0.0
Brakewear	2.49	4.2	0.0%	55.80%	6.5
Secondary Sulfate	0.28	0.5	59.0%	55.80%	0.3
Secondary Nitrate	19.80	33.4	61.3%	55.80%	20.1
(3) Space Heating Sub-Total	24.28	40.9			29.4

Wood Burning	16.03	27.0	60.0%	25.02%	13.5
Coal Burning	0.59	1.0	60.0%	25.02%	0.5
Gas & Other Heating	1.05	1.8	0.0%	25.02%	2.2
Secondary Sulfate	0.22	0.4	17.6%	25.02%	0.4
Secondary Nitrate	6.40	10.8	5.0%	25.02%	12.8
(4) Other sources	3.52	5.9			5.9

Trains	0.53	0.9	0.0%	0.0%	0.9
Planes	0.48	0.8	0.0%	0.0%	0.8
Secondary Sulfate	0.03	0.1	0.0%	0.0%	0.1
Secondary Nitrate	2.48	4.2	0.0%	0.0%	4.2

Total	100.00	168.5			137.06

Design Value 168.5 (Micrograms/Cubic Meter) 04-DEC-88
139.31 = max concentration demonstration 18-JAN-89

Note:
* % growth of VMT's each year = 3.0%
# % population growth per year = 1.5%
These figures were then projected out to the year 2003

73.0% = expected % of diesel fuel burned that will meet new SO_2 standards
15,000 lb/hr = the worst case hourly emission rate from the tall stack

TABLE IX.A.14

NORTH SALT LAKE

Source Catagory	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
(1) Major Point sources	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5

Copper smelter	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
Oil refinery cat crackers	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
Other point sources	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Secondary Sulfate	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Secondary Nitrate	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5
(2) Vehicle Sub-Total	44.8	44.5	43.4	42.6	42.2	41.7	41.2	41.4	40.9	40.7	41.2

Composite Mobile sources											
Leaded Gas Fueled	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1
Diesel Fueled	4.1	4.2	4.3	4.5	4.6	4.7	4.9	5.0	5.2	5.3	5.5
Unleaded Gas Fueled	1.9	2.0	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.5	2.6
Re-entrained road dust	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Road Salting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brakewear	4.9	5.0	5.2	5.3	5.5	5.6	5.8	6.0	6.2	6.3	6.5
Secondary Sulfate	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Secondary Nitrate	28.6	27.8	26.3	25.1	24.1	23.2	22.2	21.8	20.8	20.2	20.1
(3) Space Heating Sub-T	25.3	25.7	26.1	26.5	26.9	27.3	27.7	28.1	28.5	29.0	29.4

Wood Burning	11.6	11.8	12.0	12.2	12.4	12.5	12.7	12.9	13.1	13.3	13.5
Coal Burning	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Gas & Other Heating	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2
Secondary Sulfate	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4
Secondary Nitrate	11.0	11.2	11.4	11.5	11.7	11.9	12.1	12.2	12.4	12.6	12.8
(4) Other sources	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9

Trains	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Planes	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Secondary Sulfate	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Secondary Nitrate	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2

Total	136.58	136.62	135.92	135.58	135.49	135.45	135.36	135.91	135.84	136.14	137.06

TABLE IX.A.15

NORTH SALT LAKE

The following table shows the attainment value (after applying the control strategy) for each day that CMB modeling was performed. These values are shown for the attainment demonstration in 1993, and for each year thereafter through 2003.

CMB DAY: YEAR	26-Jan-88	05-Feb-88	06-Feb-88	08-Feb-88	02-Dec-88	03-Dec88	04-Dec-88	18-Jan-89	27-Jan-89	30-Jan-89	17-Feb-89	05-Dec-89
1993	129.1	107.6	83.8	124.3	121.3	150.3	136.6	134.2	118.9	131.9	137.5	108.9
1994	129.4	107.8	84.1	124.6	121.6	150.4	136.6	134.7	119.0	132.2	137.7	109.4
1995	129.0	107.5	84.2	124.3	121.5	149.8	135.9	134.6	118.4	132.1	137.1	109.8
1996	129.0	107.5	84.4	124.3	121.6	149.5	135.6	134.8	118.2	132.2	136.9	110.4
1997	129.1	107.6	84.7	124.4	121.8	149.5	135.5	135.2	118.2	132.5	136.9	110.9
1998	129.3	107.7	85.1	124.7	122.1	149.5	135.5	135.7	118.2	132.8	137.0	111.6
1999	129.5	107.9	85.4	124.8	122.4	149.5	135.4	136.1	118.2	133.1	137.0	112.2
2000	130.1	108.4	85.9	125.5	123.1	150.2	135.9	137.0	118.7	133.8	137.6	113.0
2001	130.3	108.5	86.2	125.7	123.4	150.2	135.8	137.4	118.7	134.2	137.7	113.6
2002	130.8	108.8	86.7	126.2	124.0	150.6	136.1	138.1	119.0	134.8	138.1	114.4
2003	131.7	109.6	87.3	127.1	124.9	151.7	137.1	139.3	119.9	135.8	139.0	115.3

TABLE IX.A.16

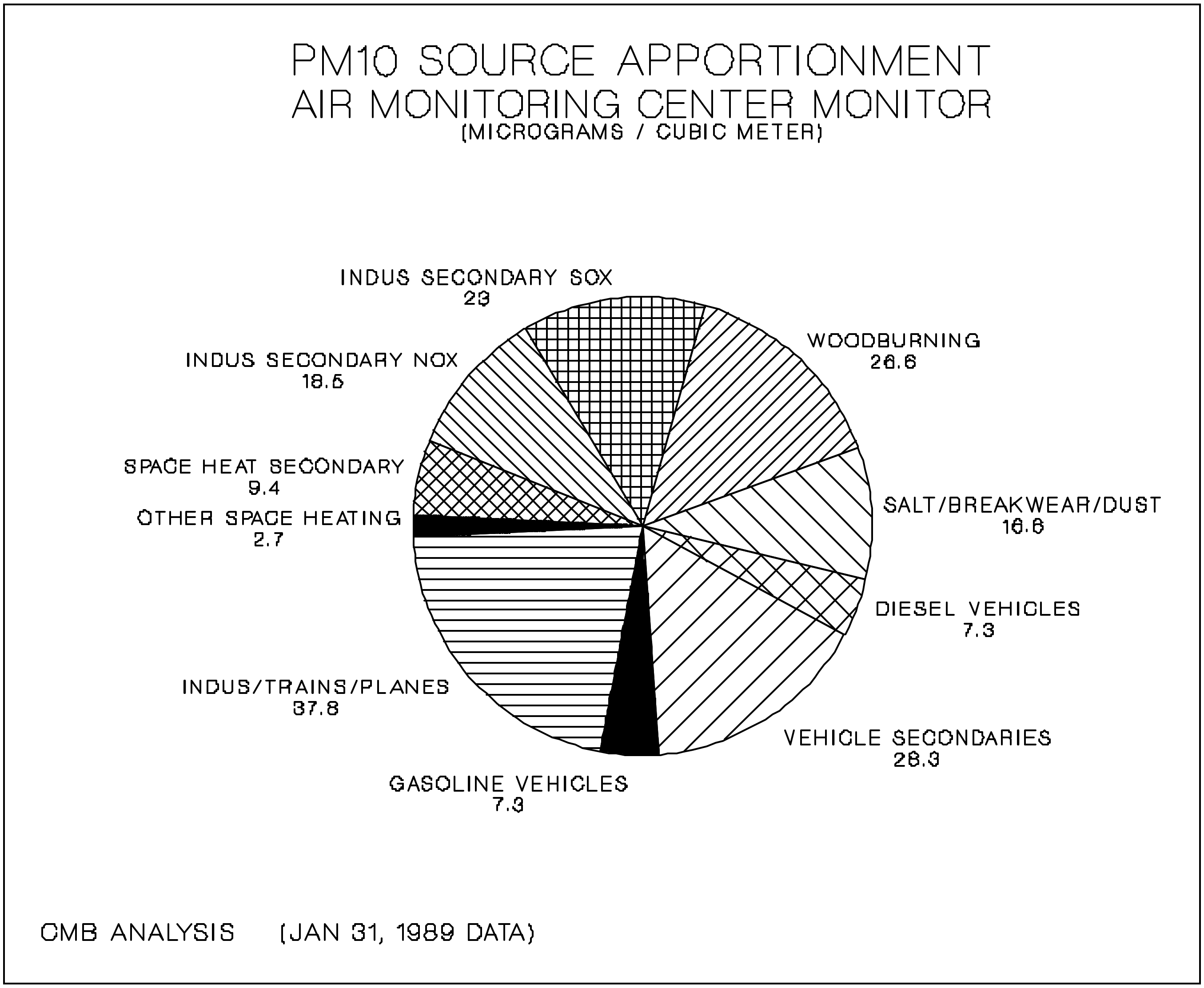


FIGURE IX.A.20

Source Apportionment. Figure IX.A.20 graphically demonstrates the source apportionment data contained on Table IX.A.17 on the following page and shows the contribution which the summarized components made to the overall concentration of PM_{10} at the Air Monitoring Center monitoring site on January 31, 1989, which is the design day for the Air Monitoring Center monitoring site.

Attainment Demonstration. Tables IX.A.17, IX.A.18, and IX.A.19 show how the control strategies will reduce the PM_{10} concentrations at the Air Monitoring Center monitoring site to levels below the 150 g/m^3 standard through calendar year 2000. Mobile IV projections using new motor vehicle control program NO_x emission factors indicate that there will be ample reduction from the new program to maintain ambient levels below the standard for over eight years. This is the attainment demonstration for the Air Monitoring Center monitoring site.

UTAH STATE DEPARTMENT OF HEALTH
Division of Environmental Health
Bureau of Air Quality
PM10 S.I.P Control Strategy Worksheet

Site: Air monitoring Center — Date: 26-AUG-92
Period: EXCEEDANCE DAYS IN WINTERS 88/89,89/90 — Projection: 1999

Source Catagory	Design Day % Contribution	Impact	Additional Control	Additional Growth	Attainment Impact
(1) Major Point sources	41.17	73.0	18.6%	0.00%	59.5
Copper smelter	0.00	0.0	41.2%	0.00%	0.0
Oil refinery cat crackers	5.35	9.5	-15.8%	0.00%	11.0
Other point sources	12.42	22.0	36.4%	0.00%	14.0
Secondary Sulfate	12.97	23.0	60.0%	0.00%	9.2
Secondary Nitrate	10.42	18.5	-36.6%	0.00%	25.3
(2) Vehicle Sub-Total	33.47	59.4			53.6
Composite Mobile sources	8.18	14.5			
Leaded Gas Fueled	2.52	4.5	6.0%	38.42%	5.8
Diesel Fueled	4.10	7.3	23.8%	38.42%	7.7
Unleaded Gas Fueled	1.55	2.8	6.0%	38.42%	3.6
Re-entrained road dust	7.54	13.4	0.6%	0.00%	13.3
Road Salting	0.00	0.0	0.0%	0.00%	0.0
Brakewear	1.82	3.2	0.0%	38.42%	4.5
Secondary Sulfate	0.34	0.6	59.0%	38.42%	0.3
Secondary Nitrate	15.59	27.7	51.9%	38.42%	18.4
(3) Space Heating Sub-Total	21.86	38.8			26.2
Wood Burning	15.02	26.6	60.0%	17.79%	12.6
Coal Burning	0.55	1.0	60.0%	17.79%	0.5
Gas & Other Heating	0.98	1.7	0.0%	17.79%	2.0
Secondary Sulfate	0.27	0.5	0.0%	17.79%	0.6
Secondary Nitrate	5.04	8.9	0.0%	17.79%	10.5
(4) Other sources	3.51	6.2			6.2
Trains	0.79	1.4	0.0%	0.0%	1.4
Planes	0.73	1.3	0.0%	0.0%	1.3
Secondary Sulfate	0.04	0.1	0.0%	0.0%	0.1
Secondary Nitrate	1.95	3.5	0.0%	0.0%	3.5
Total	100.00	177.4			145.47

Design Value 177.4 (Micrograms/Cubic Meter) 31-Jan-89
149.24 = max concentration demonstration 18-Jan-89

Note:
* % growth of VMT's each year = 3.0%
# % population growth per year = 1.5%
These figures were then projected out to the year 1999

73.0% = expected % of diesel fuel burned that will meet new SO_2 standards
15,000 lb/hr = the worst case hourly emission rate from the tall stack

TABLE IX.A.17

AIR MONITORING CENTER

Source Catagory	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
(1) Major Point sources	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5

Copper smelter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oil refinery catcracker	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Other point sources	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Secondary Sulfate	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2
Secondary Nitrate	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3
(2) Vehicle Sub-Total	55.3	55.2	54.5	54.1	53.9	53.8	53.6	54.0	53.8	54.0	54.6

Composite Mobile sources											
Leaded Gas Fueled	4.9	5.0	5.2	5.3	5.5	5.6	5.8	6.0	6.2	6.4	6.5
Diesel Fueled	6.4	6.6	6.8	7.0	7.2	7.5	7.7	7.9	8.2	8.4	8.6
Unleaded Gas Fueled	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
Re-entrained road dust	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Road Salting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brakewear	3.8	3.9	4.0	4.1	4.2	4.3	4.5	4.6	4.8	4.9	5.0
Secondary Sulfate	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4
Secondary Nitrate	23.7	23.0	21.8	20.8	20.0	19.2	18.4	18.1	17.3	16.7	16.7
(3) Space Heating Sub-T	23.9	24.3	24.6	25.0	25.4	25.8	26.2	26.5	26.9	27.3	27.8

Wood Burning	11.5	11.7	11.8	12.0	12.2	12.4	12.6	12.7	12.9	13.1	13.3
Coal Burning	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5
Gas & Other Heating	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2
Secondary Sulfate	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6
Secondary Nitrate	9.6	9.8	9.9	10.1	10.2	10.4	10.5	10.7	10.9	11.0	11.2
(4) Other sources	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2

Trains	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Planes	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Secondary Sulfate	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Secondary Nitrate	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5

Total	144.93	145.20	144.87	144.84	145.03	145.27	145.47	146.21	146.45	146.99	148.07

TABLE IX.A.18

AIR MONITORING CENTER

The following table shows the attainment value (after applying the control strategy) for each day that CMB modeling was performed. These values are shown for the attainment demonstration in 1993, and for each year thereafter through 2003.

CMB DAY:	1-18-89	1-19-89	1-20-89	1-30-89	1-31-89	2-17-89	2-18-89	11-21-89	12-02-89	12-03-89	12-04-89	12-06-89	12-27-89
YEAR													
1993	149.0	134.0	122.1	135.5	144.9	139.8	121.0	94.6	96.5	100.2	110.4	93.0	107.3
1994	149.3	134.4	122.5	135.7	145.2	140.0	121.1	95.0	96.7	100.4	110.8	93.6	107.5
1995	148.8	134.2	122.3	135.2	144.9	139.6	120.6	95.2	96.6	100.2	111.0	94.2	107.3
1996	148.7	134.3	122.4	135.0	144.8	139.6	120.4	95.5	96.7	100.2	111.2	94.8	107.3
1997	148.8	134.6	122.8	135.1	145.0	139.7	120.4	95.9	96.8	100.3	111.6	95.4	107.4
1998	149.1	135.0	123.1	135.2	145.3	139.9	120.4	96.2	97.0	100.4	112.0	96.1	107.6
1999	149.2	135.3	123.5	135.3	145.5	140.0	120.4	96.6	97.2	100.5	112.5	96.8	107.7
2000	150.1	136.1	124.3	136.0	146.2	140.7	121.1	97.2	97.7	101.0	113.1	97.6	108.1
2001	150.3	136.5	124.7	136.1	146.4	140.9	121.1	97.6	97.9	101.1	113.5	98.3	108.2
2002	150.9	137.2	125.4	136.6	147.0	141.3	121.5	98.1	98.3	101.4	114.1	99.1	108.6
2003	152.2	138.3	126.5	137.7	148.1	142.3	122.5	98.8	98.9	102.1	114.9	99.9	109.2

TABLE IX.A.19

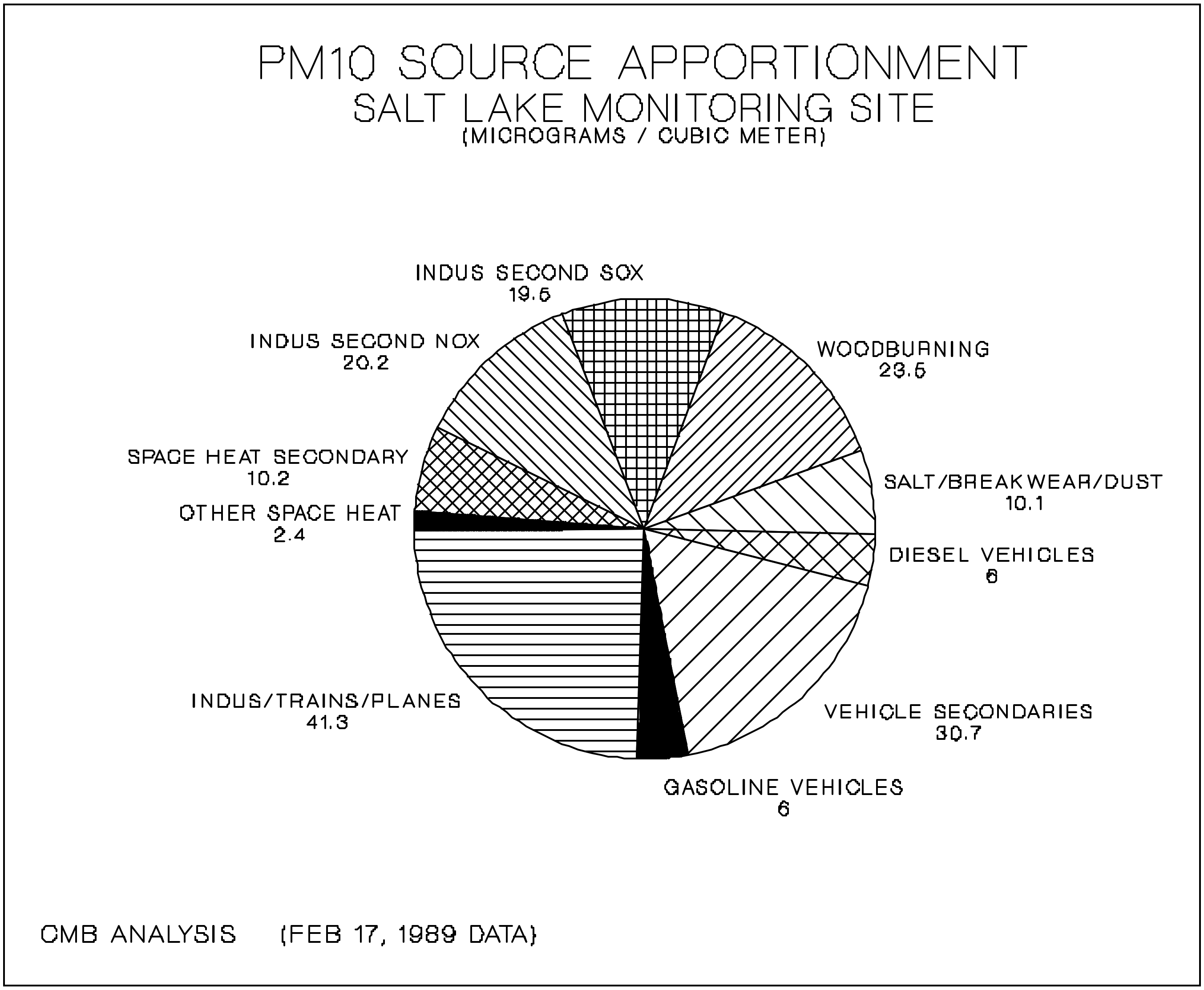


FIGURE IX.A.21

Source Apportionment. Figure IX.A.21 graphically demonstrates the source apportionment data contained on Table IX.A.20 on the following page and shows the contribution which the summarized components made to the overall concentration of PM_{10} at the Salt Lake monitoring site on February 17, 1989, which is the design day for the Salt Lake monitoring site.

Attainment Demonstration. Tables IX.A.20, IX.A.21, and IX.A.22 show how the control strategies will reduce the PM_{10} concentrations at the Salt Lake monitoring site to levels below the 150 g/m^3 standard through calendar year 2003. Mobile IV projections using new motor vehicle control program NO_x emission factors indicate that there will be ample reduction from the new program to maintain ambient levels below the standard for over ten years. This is the attainment demonstration for the Salt Lake monitoring site.

UTAH STATE DEPARTMENT OF HEALTH
Division of Environmental Health
Bureau of Air Quality
PM10 S.I.P. Control Strategy Worksheet

Site: Salt Lake City Monitor — Date: 26-AUG-92
Period: EXCEEDANCE DAYS IN WINTERS 88/89,89/90 — Projection:2003

Source Catagory	Design Day % Contribution	Impact	Additional Control	Additional Growth	Attainment Impact
(1) Major Point sources	43.98	74.7	19.6%	0.00%	60.1
Copper smelter	5.69	9.7	41.2%	0.00%	5.7
Oil refinery cat crackers	3.23	5.5	-15.8%	0.00%	6.3
Other point sources	11.71	19.9	36.4%	0.00%	12.6
Secondary Sulfate	11.45	19.5	60.0%	0.00%	7.8
Secondary Nitrate	11.90	20.2	-36.6%	0.00%	27.6
(2) Vehicle Sub-Total	31.19	53.0			46.4
Composite Mobile sources	7.09	12.0			
Leaded Gas Fueled	2.18	3.7	6.0%	55.80%	5.4
Diesel Fueled	3.56	6.0	23.8%	55.80%	7.2
Unleaded Gas Fueled	1.35	2.3	6.0%	55.80%	3.4
Re-entrained road dust	4.21	7.1	0.6%	0.00%	7.1
Road Salting	0.00	0.0	0.0%	0.00%	0.0
Brakewear	1.80	3.0	0.0%	55.80%	4.8
Secondary Sulfate	0.30	0.5	59.0%	55.80%	0.3
Secondary Nitrate	17.80	30.2	61.3%	55.80%	18.2
(3) Space Heating Sub-Total	21.25	36.1			26.1
Wood Burning	13.85	23.5	60.0%	25.02%	11.8
Coal Burning	0.51	0.9	60.0%	25.02%	0.4
Gas & Other Heating	0.90	1.5	0.0%	25.02%	1.9
Secondary Sulfate	0.23	0.4	17.6%	25.02%	0.4
Secondary Nitrate	5.75	9.8	5.0%	25.02%	11.6
(4) Other sources	3.58	6.1			6.1
Trains	0.69	1.2	0.0%	0.0%	1.2
Planes	0.63	1.1	0.0%	0.0%	1.1
Secondary Sulfate	0.03	0.1	0.0%	0.0%	0.1
Secondary Nitrate	2.23	3.8	0.0%	0.0%	3.8
Total	100.00	169.9			138.69

Design Value 169.9 (Micrograms/Cubic Meter) 17-Feb-89
142.21 = max concentration demonstration

Note:
* % growth of VMT's each year = 3.0%
# % population growth per year = 1.5%
These figures were then projected out to the year: 2003

73.0% = expected % of diesel fuel burned that will meet new SO_2 standards

15,000 lb/hr = the worst case hourly emission rate from the tall stack

TABLE IX.A.20

SALT LAKE CITY

Source Catagory	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
(1) Major Point sources	60.1	60.1	60.1	760.1	60.1	60.1	60.1	60.1	60.1	60.1	60.1

Copper smelter	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Oil refinery cat crackers	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Other point sources	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6
Secondary Sulfate	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
Secondary Nitrate	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6
(2) Vehicle Sub-Total	48.6	48.4	47.5	47.0	46.6	46.3	46.0	46.2	45.8	45.8	46.4

Composite Mobile sources											
Leaded Gas Fueled	4.0	4.2	4.3	4.4	4.6	4.7	4.8	5.0	5.1	5.3	5.4
Diesel Fueled	5.3	5.5	5.7	5.8	6.0	6.2	6.4	6.6	6.8	7.0	7.2
Unleaded Gas Fueled	2.5	2.6	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4
Re-entrained road dust	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1
Road Salting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brakewear	3.5	3.6	3.8	3.9	4.0	4.1	4.2	4.3	4.5	4.6	4.8
Secondary Sulfate	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Secondary Nitrate	25.9	25.2	23.8	22.7	21.9	21.0	20.1	19.8	18.9	18.3	18.2
(3) Space Heating Sub-Total	22.5	22.9	23.2	23.6	23.9	24.3	24.6	25.0	25.4	25.8	26.1

Wood Burning	10.1	10.3	10.4	10.6	10.8	10.9	11.1	11.3	11.4	11.6	11.8
Coal Burning	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Gas & Other Heating	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.9	1.9	1.9
Secondary Sulfate	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Secondary Nitrate	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.3	11.4	11.6
(4) Other sources	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1

Trains	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Planes	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Secondary Sulfate	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Secondary Nitrate	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8

Total	137.34	137.46	136.91	136.68	136.68	136.74	136.75	137.34	137.38	137.75	138.69

Table IX.A.21

SALT LAKE CITY

The following table shows the attainment value (after applying the control strategy) for each day thatB modeling was performed. These values are shown for the attainment demonstration in 1993, and for each year thereafter through 2003.

CMB DAY: YEAR	04-Jan-88	26-Jan-88	28-Jan-88	05-Feb-88	03-Dec-88	18-Jan-89	20-Jan-89	30-Jan-89	17-Feb-89
1993	90.1	121.3	84.7	108.5	126.8	139.1	113.6	116.8	137.3
1994	90.4	121.6	85.1	108.6	126.9	139.3	114.1	117.1	137.5
1995	90.4	121.5	85.3	108.3	126.4	139.0	114.3	117.0	136.9
1996	90.6	121.6	85.6	108.2	126.1	139.0	114.7	117.0	136.7
1997	90.8	121.8	86.0	108.3	126.1	139.2	115.2	117.3	136.7
1998	91.1	122.1	86.4	108.4	126.1	139.4	115.8	117.5	136.7
1999	91.3	122.3	86.8	108.5	126.1	139.6	116.3	117.8	136.8
2000	91.9	123.0	87.4	109.0	126.6	140.4	117.1	118.4	137.3
2001	92.2	123.2	87.8	109.1	126.6	140.6	117.7	118.7	137.4
2002	92.6	123.7	88.4	109.4	126.9	141.1	118.4	119.2	137.7
2003	93.3	124.6	89.1	110.2	127.8	142.2	119.4	120.2	138.7

Table IX.A.22

IX.A.6 CONTROL STRATEGIES

IX.A.6.a. The following control strategies were implemented to control PM_{10} emissions in the Magna portion of the Salt Lake nonattainment area:

After the issuance of a Notice of Violation and a series of negotiations between Kennecott and the Utah Air Conservation Committee, an agreement was signed whereby Kennecott agreed to:

(1) construct a series of dikes and sprinkler systems on the tailings pond which would allow the company to distribute water on the pond until the company began operation;

(2) replace the existing tailings distribution system to guarantee that the tailings pond would remain covered with wet tailings after the company began operation;

(3) apply controls to the periphery of the pond;

(4) develop and submit a plan to control emissions from the pond in the event of a temporary plant shutdown; and

(5) develop a plan to control emissions from the pond in the event of a permanent plant shutdown.

Following the restart of operations by Kennecott, the Executive Secretary of the Air Conservation Committee issued a compliance order dated October 4, 1989, to Kennecott which required Kennecott to replace and upgrade the peripheral discharge system for tailings flowing to the tailings pond and implement plans for dust control during current operation, temporary shutdown, and permanent shutdown of the mine and associated tailings pond. The peripheral discharge system completed July 1, 1988, allows Kennecott to keep the surface of the tailings pond wet and thereby reduce or eliminate blowing tailings. As summarized in Table IX.A.23, since the completion of the new system, similar meteorological conditions have not resulted in a violation of the NAAQS. The compliance order has corrected the problem of ambient PM_{10} violations caused by blowing Kennecott tailings in the Magna area.

DATE	MEASURED CONCENTRATION	MAXIMUM WIND SPEED (MPH)	WIND DIRECTION (DEGREES)
9-27-88	87	9	232
5-18-89	35	25	156
5-23-89	42	19	231
8-23-89	53	23	169
9-30-89	36	25	293

TABLE IX.A.23

IX.A.6.b. The following industrial control strategies will be implemented to control PM_{10} emissions in the Utah County nonattainment Area:

a) All industrial sources of PM_{10} in Utah County comprise 68.14% of the PM_{10} impact at the Lindon monitoring site, 72.24% at the West Orem monitoring site, and 55.74% at the North Provo monitoring site. New operating parameters and emissions limitations for PM_{10}, SO_2, and NO_x for all existing sources of primary and secondary PM_{10} impacting the ambient concentrations at the monitor site are detailed in Section IX, Part H of the Utah State Implementation Plan. It must be noted that although the allowable emissions levels have been reduced significantly, the actual emissions levels have the potential to increase slightly since many sources in the inventory were not operating or in existence during the winter of 1988, and the State is required to demonstrate attainment when all sources are operating at their permitted levels. This is documented in the Technical Support Document.

IX.A.6.c. The following industrial control strategies will be implemented to control PM_{10} emissions in the Salt Lake nonattainment area:

(1) All industrial sources of PM_{10} located in or impacting the Salt Lake nonattainment area comprised 41.17% of the PM_{10} impact (primary and secondary) at the AMC monitoring site, 43.98% at the Salt Lake monitoring site, and 42.92% at the North Salt Lake monitoring site on the design day at each site which occurred during the winter period. RACT requirements were developed for all sources impacting the nonattainment area, as a minimum, and new operating parameters and emissions limitations for PM_{10}, SO_2, and NO_x for all existing sources of primary and secondary PM_{10} impacting the ambient concentrations at the monitor sites are detailed in Section IX, Part H of the SIP. It must be noted that, although the allowable emissions levels have been reduced significantly, the actual emissions levels have the potential to increase slightly, since some sources in the inventory were not operating or in existence during the winter of 1988/89, and the State is required to demonstrate attainment when all sources are operating at their permitted levels. This is documented in the Technical Support Document.

(2) Refinery Category. The refineries located in Salt Lake and Davis counties had emission limitations and annual emission estimates assigned in the PM_{10} SIP based on the following rationale:

(a) After reviewing several years worth of operational records provided by the five refineries for emission estimates/calculations and production levels, the State agreed with the refinery officials that there was significant variability from day to day and from year to year. Therefore, the refineries were allowed maximum never-to-be exceeded daily limits of PM_{10}, SO_2, NO_x based on the apparent variability. Emissions were capped at these maximum levels from the sources that could have their emissions determined by fuel metering/and calculations and from the other sources that would be stack tested every 1-3 years. The process flaring emissions and the emissions from the sulfur removal unit turnarounds were not included in the emission limitations.

(b) The basic RACT applied to all refineries was: 1) a sulfur removal unit/plant (SRU) that will remove 95% of the sulfur from the streams fed to it (Amine plant and sour water overhead stripper streams included), and for which routine maintenance turnarounds are restricted to the summer months; 2) a restriction on the burning of liquid fuel oil except during natural gas curtailments and/or as specified in the individual subsection of Section IX, Part H of the SIP, wherein a refinery could choose to burn this fuel but would need to trade-off the emissions equally (ton of SO_2 for ton of NO_x); and 3) a requirement for the use of Low-SO_x catalyst emission reduction techniques/procedures for fluid catalytic cracking units which would result in no more than 9.8 kg of SO_2 emitted per 1000 kg of coke burn-off (9.8 lb SO_2/1000 lb coke burn-off). Because the increase of sulfur content of the crude feed-stock now being experienced and expected to continue for the refineries, the State felt it was necessary to allow some flexibility by not requiring RACT controls/reductions on the NO_x sources. Thus, as the sulfur content in the crude increased, the refineries would be allowed to increase their SO_2 emissions by trading-off NO_x reductions from application of Lo-NO_x technologies, as approved by the Executive Secretary.

(c) Low-SO_x catalyst technology was considered RACT; however, a refinery could choose to trade-off NO_x emissions equivalent to that obtained by the 9.8 lb SO_2/1000 lb coke burn-off NSPS limit. Chevron USA choose to do this.

(d) No burning of liquid fuel oil was considered RACT, if it could be justified economically; however, a refinery could choose to trade-off the SO_2 by an increase of SRU efficiency or by applying NO_x controls. AMOCO may choose to do this.

(e) An allowance was made for AMOCO, Flying-J and Crysen because of their low process flaring emissions in comparison to those from Chevron and Phillips. Chevron's estimated flaring emissions (approx 250 tpy SO_2) were used as a basis and an amount was allowed for the three refineries as calculated using a feed through put ratio:

eg: $\frac{\text{AMOCO throughput (bbl/day)}}{\text{Chevron throughput (bbl/day)}}$ x Chevron flare SO_2 emissions = allowance of SO_2 for AMOCO

These ratioed amounts were then added to the three refinery SO_2 allowed emissions used for compliance.

(f) An allowance was made for Flying-J and Crysen using low sulfur content crude in their operation in comparison with AMOCO, Chevron and Phillips' average crude sulfur contents. Flying-J and Crysen were allowed to use AMOCO's estimated 1988 0.24% by weight sulfur content crude in the calculations of Post-SIP emissions for these two refineries.

IX.A.6.d. Solid Fuel Burning Devices:

Solid Fuel Burning Devices contribute a significant proportion to the PM_{10} concentrations in Davis, Salt Lake, and Utah Counties.

In 1987 the UACC adopted Subsection r307-1-4.13, UACR, Emissions Standards for Residential Solid Fuel Burners and Fireplaces, which established a limitation on the sulfur and volatile ash content of coal sold for direct space heating for residential solid fuel burners and fireplaces, and limited the emissions from these devices to 40% opacity as measured by EPA Method 9. As part of the development process of this SIP, the maximum opacity was changed to 20%. Although no credit will be claimed for these control strategies, its enforcement can help insure the proper operation of solid fuel burning devices.

The Bureau of Air Quality is proposing the initiation of a program beginning September 1, 1992, to control emissions from residential solid fuel burning devices which is detailed below. The BAQ will collect the data necessary to verify the effectivness of the program, and begin its information, public awareness, and public education programs before the program takes effect in 1992. The period from the promulgation of the program until the winter of 1992/1993 will also allow the BAQ the opportunity to implement and verify the proper functioning of the notification system that will be established and examine the potential of using a voluntary no-burn period to achieve the reductions in woodburning emissions required to meet the goals of this SIP. This interim period will also allow citizens who will be affected by the mandatory no-burn periods time to adjust their home heating requirements. Also, residents with sole source devices will be requested to certify these as such with the Executive Secretary or the appropriate local district health office.

(1) Emissions from wood burning devices account for 35.7 $\mu g/m^3$, which is equivalent to 13.5% of the PM_{10} concentrations at West Orem in Utah County. The following control strategies will be used to reduce emissions from wood burning devices in Utah County:

(a) Subsection R307-1-4.13.3, UACR establishes mandatory no burn periods (beginning September 1, 1992) for areas in Utah County which are north of the southernmost border of Payson City and east of State Route 68. The regulation establishes a mandatory no burn period when the ambient concentration of PM_{10} reaches 120 $\mu g/m^3$ as measured by the real-time monitor located at the Lindon monitoring site. During the mandatory no-burn period, citizens may not use any solid fuel burning devices or fireplaces except those which are registered with the Bureau of Air Quality or the local health district office as being the sole source of heat for the entire residence or which have no visible emissions. The no-burn period will be in effect until the Executive Secretary issues a statement declaring an end to the no-burn period.

(b) The City County Health Department of Utah County has committed itself to adopt local regulations which mirror those which are promulgated with this plan. The Board of County Commissioners of Utah County has adopted a resolution which supports the implementation of a woodburning control program in Utah County, and a copy of that resolution is contained in the technical support document. The regulations adopted by the City-County Health Department of Utah County will be formally adopted into this SIP after they have been formally submitted to the UACC.

(c) The Utah County Commission on Clean Air has submitted a plan which is incorportated by reference into this SIP and is contained in the Technical Support Document, and which proposes the following programs be established by appropriate local government agencies in Utah County:

(i) Banning of Coal Burning.

The county proposes a ban on all forms of residential coal burning within the County. This could result in a further decrease of 30%, or an additional 0.4 $\mu g/m^3$.

(ii) Installer and operator training programs for residential solid fuel burning devices.

A 5% reduction credit for this program is included in the "no-burn" period program.

(iii) Solid fuel burner inspection program.

A 5% reduction credit for this program is included in the "no-burn" period program.

(iv) Weatherization Requirements for Homes.

Allowable EPA credits for the implementation of requirements regarding the proper weatherization of homes has a maximum reduction of 5 percent. The state is claiming a 2% reduction in space heating emissions.

(v) All of the above strategies (a)-(d) are used as support for the adoption of the solid fuel burning device control strategy, and are used to justify the 60% emission reduction credit claimed in this SIP.

(2) Primary particulate emissions from solid fuel burning devices in the Salt Lake/Davis County area account for up to 27.0µg/m^3, which is equivalent to 16.03% of the PM_{10} concentrations in this area. The following control strategies will be used to reduce emissions from wood burning devices in the Salt Lake nonattainment area:

(a) Subsection R307-1-4.13.3, UACR, establishes mandatory no burn periods for all of Salt Lake County and for areas in Davis County which are south of the southern-most border of Kaysville when the ambient concentration of PM_{10} reaches 120 µg/m^3 and the forecasted weather includes a temperature inversion which is predicted to continue for at least 24 hours. During these mandatory no burn periods, it will be unlawful for individuals to use any solid fuel burning device or fireplaces except those which are registered with the Bureau of Air Quality or the local health district office as being the sole source of heat for the entire residence or devices and fireplaces having no visible emissions.

(b) Rules adopted by the Salt Lake City-County Board of Health and Davis County Board of Health which incorporate the regulations adopted by the State will be included into this SIP when they have been received from the county.

(3) The following control strategies will be implemented to reduce emissions from residential solid fuel burning devices in all PM_{10} nonattainment areas:

(a) Enforcement of the mandatory no burn period will involve an intensive effort from both the Bureau of Air Quality and the local health departments. During the mandatory no burn periods, 8 inspectors from the BAQ will conduct round-the-clock inspections. When a device or fireplace is observed burning, the inspectors may at reasonable times contact the individuals and inform them of the potential violation. The individuals using the fireplace or device may also be informed at that time of the BAQ penalty policy. The inspector will note the address of the observed burning devices or fireplaces. The following day the inspector will determine if the individuals who were burning the previous night are first time or repeat offenders and as soon as possible (within 24 hours), the inspector will implement the provisions of the penalty policy.

(b) The enforcement will also include the investigation of calls received at either the BAQ or the local health department. After a call is received, an inspector will visit the address of the suspected offender and verify if there is actually a violation of the mandatory no burn period. The individual will be contacted and notified of the possibility of penalties. The inspector will return to the office and determine if the individual is a first time or repeat offender and the inspector will implement the provisions of the penalty policy.

(c) Because the Bureau of Air Quality will have the primary responsibility to notify the public of the existence of a mandatory no burn period, the Bureau will reach an agreement by July 1, 1992 with the various news media to ensure that the public is informed of the mandatory no burn periods. A discussion of the media cooperation effort will be included in the technical support document when it is completed.

(d) To provide for a coordinated enforcement mechanism for the provisions of the mandatory no burn period, the Bureau will negotiate enforcement agreements by May 15, 1992, with the offices of the respective county sheriffs, the county fire marshals, the local fire departments, the local law enforcement agencies of each incorporated municipality, and the local city, county or district health departments.

(e) To strengthen the enforcement capabilities of the local health officers and alleviate any additional burden which penalization of those found in violation of the local county ordinances may have on the court system, the BAQ will work in cooperation with the local health officials to seek a statutory change to allow the assessment and collection of administrative penalties by the local health departments for woodburning violations.

(f) The implementation of the mandatory no burn period in Salt Lake County and the affected areas of Davis and Utah Counties by the BAQ and the local health department will result in a 60% decrease in emissions from wood burning devices.

(g) Beginning in the spring of 1992, the BAQ will concentrate on the development of a public awareness (PA) program. The program will be geared towards informing the public of the wood burning regulations, the proper installation and operation of solid fuel burning devices, the use of clean fuels, the health effects of wood burning, and the advantages of using a EPA Phase II certified stoves or natural gas. This PA program will be accomplished by using pamphlets, seminars, a booth at the State Fair, and having public discussions on the television and in the newspapers.

(h) The penalty policy which was adopted by the UACC in R446-4 of the Utah Air Conservation Regulations is used by the Executive Secretary to determine penalty amounts to be placed on air pollution sources for violations of the UACR. Category D. of this policy allows for up to $299 to be assessed against private citizens for non-compliance to the UACR, including the wood burning regulations.

The following guidelines will be followed for violations and penalty amounts:

Violation	Penalty/Violation
(i) First Violation	Assess Penalty $0 -$25 Issue a NOV
(ii) Second Violation	Assess Penalty $50 - $150 Issue a NOV
(iii) Third Violation	Assess Penalty $150 - $299 Issue NOV

Sites found with solid fuel burning devices and fireplaces operating illegally during a mandatory no-burn period will be reinspected within 24 hours and issued another notice of violation (NOV), if still not in compliance.

(4) Emissions from coal burning stoves can be significant. For example, they account for 0.6% or 1.4 $\mu g/m^3$ of the PM_{10} impact at the Lindon monitoring station. The mandatory no burn period will also preclude the use of coal burning stoves unless they are the sole source of heat, and after 1993, the use of coal stoves will be precluded unless they are able to operate with no visible emissions. The mandatory no burn will result in a 50% reduction of the emissions from coal burning stoves, or 0.7 $\mu g/m^3$.

IX.A.6.e. PROVO CANYON CLOSURE TO TRUCK TRAFFIC

The Utah Department of Transportation (UDOT) is in the process of upgrading the Provo Canyon road into a four lane highway. The Provo Canyon Coalition is advocating that all non-destinational heavy duty truck traffic be banned from Provo Canyon. The coalition hired TRC Consultants to do a study of the situation. A copy of that study is contained in the Technical Support Document. Review of the study indicates that it is necessary to evaluate and consider this issue further before any action is taken by the UACC to recommend to the appropriate agency that they limit the use of the canyon by heavy duty diesel trucks. However, based on information currently available to the Committee, the Committee recommends that all non-destinational heavy duty truck which are on the interstate system should remain on the interstate system. The Committee also recommends at this time that the Utah Department of Transportation work with the Bureau of Air Quality to perform the necessary studies to determine the impact which heavy duty diesel truck traffic in Provo Canyon has on the air quality in Utah County and the impact which it would have were it moved to Salt Lake County.

IX.A.6.f. DIESEL INSPECTION AND MAINTENANCE PROGRAM AS ADOPTED

At the time of PM10 SIP proomulgation, the diesel I/M program was still in its conceptual stage. Subsequent negotiations on the national level between the California Air Resources board and the Trucking Association were instrumental in shaping the test procedures developed by the Society of Automotive Engineers and the diesel I/M program adopted by the Utah Air Quality Board. The anticipated "fine-tuning" of the program, as well as its relevance to the ozone program in Salt Lake and Davis Counties, makes it administratively more appropriate to structure the SIP to provide the diesel I/M program its own section. Thus, the details of the program as adopted by the Air Quality Board may now be found in Section XXI of the SIP.

IX.A.6.g. ROAD SALTING AND SANDING

Road salting and sanding and re-entrained road dust account for up to 17.4 $\mu g/m^3$ of the observed PM_{10} concentrations in Utah County on the design day and up to 13.4 g/m^3 at the Salt Lake nonattainment Area monitors. The controlling of road salting/sanding has been reviewed as a source of PM_{10} emissions reductions. The Utah Air Conservation Regulations were changed as a part of the development of this plan to limit the application of de-icing/deslicking material on roads in any PM_{10} nonattainment area to salt containing no more than 2% insoluble solids and the application of sand or crushed slag of which no more than 10% could pass through a #16 mesh, which contained no more that 3% fines, and had a Vicker's Hardness of 1000+. This regulation was predicted to reduce the emissions from road dust and road salting and sanding by 20%.

In response to comments received at the public hearings for this SIP, it was determined that it was essential for the State to gather more information in order to confirm the 20% reduction. The proposed rule was changed to eliminate the limitations on salt/sand/slag applied during the winter of 1991-1992, although it still required that records of the amount and type of material applied be maintained and made available to the Executive Secretary. During the late fall and early winter of 1990 and in the early winter of 1991/1992, EPA and the State committed to fund a study whereby data would be collected to determine the background concentrations of re-intrained road dust and the amount of salt/grit left on the road system after application to verify the 20% reduction claim.

With the study still pending it was agreed that, within 6 months of the completion of the study, all agencies responsible for the application of salt, sand, or other deslicking grit to any roadway in a PM_{10} nonattainment area would submit to the UACC for its approval and incorportation into this SIP a plan and implementation schedule which would establish methods which would be used to reduce initial street loading of particulate matter by 25% from the amount applied during the 1989 base year, e.g., by using sand containing a lower percentage of fine material, using more durable grit or sand material, applying street cleaning methods, being more restrictive on the amount of material applied, or any other method aproved by the UACC. Those methods included in the Plan were to have been implemented within 6 months of the submittal of the plan, but no latter than October 1, 1993.

As a result of the study, the use of salt that is at least 92% sodium chloride has been determined to be Reasonably Available Control Technology for salting, and R307-1-3.2.7 has been revised to require that anyone using any other substance must either demonstrate that the material contributes no more PM10 emissions than salt that is at least 92% sodium chloride, or must vacuum sweep every arterial roadway to which the material was applied within three days of the end of the storm. The rule as revised no longer requires the submittal of a plan and schedule to reduce street loading of particulatematter by 25%, nor does it require an annual submittal of verification of compliance.

As authorized by Section 19-2-104 of the Utah Code, and as the enforcement mechanism of this regulation, the BAQ will require the maintenance of records of the material applied by those who are responsible for the application of salt/sand/grit to the road system. For salt, the records will include the quantity applied, the percent by weight of insoluble solids in the salt, and the percentage of the material that is sodium chloride (NaCl). For sand or crushed slag the records will include the quantity applied and the percent by weight of fine material which passes the number 200 sieve in a standard gradation analysis. All records must be maintained for a period of at least two years, and the records shall be made available to the Executive Secretary upon request.

IX.A.7 MAINTENANCE

The preceding demonstrations have shown that the PM_{10} NAAQS will be achieved no later than December 31, 1993. Having once attained the standards it is necessary to maintain ambient PM_{10} concentrations below the standards in order to protect the health of the citizens living in these areas. Eliminating the impact of growth on PM_{10} concentrations is the key to maintaining the PM_{10} NAAQS. Anticipating the areas where growth will occur is difficult and uncertain. The areas where it is anticipated that growth will occur are population; vehicle miles traveled (VMT); home heating; commercial heating; and industrial.

IX.A.7.a Population is projected to grow at 1.5% per year.

(1) Home heating natural gas furnaces. The growth in natural gas home heating will result in an increase of 1.2 tons/year in PM_{10}, SO_2, and NO_x. A Utah County proposal to establish building code requirements for additional weatherization will reduce the anticipated impact in that county.

(2) Fireplace and wood stove growth. New home construction is 1.5% per year. Information from building permits indicate that 65% to 70% of new homes are constructed with a fireplace or wood stove. An additional 15% to 20% are constructed with the foundation and keyway inplace for a fireplace to be added later. The results of the woodburning surveys in Lindon and Salt Lake indicate that > 30% of those who have wood burning devices are serious woodburners. Most serious wood burners use wood stoves. Federal law prohibits the sale of non-certified stoves after July 1, 1990. The mandatory no burn requirement will restrict the impact of new wood stoves. The exemption that allows only the use of wood stoves and fireplaces with no visible emissions during the mandatory no-burn periods will further limit the increase in woodburning emissions. It is anticipated that the increase in emissions which will occur from the increased number of fireplaces and wood stoves is only 0.2% or 1.2 tons per year.

IX.A.7.b. The vehicle fleet is growing at about 4.5% per year. This growth is also reflected in the increase in vehicle miles traveled and is important to the extent that it identifies the rate at which newer, less polluting vehicles are replacing older, more polluting vehicles.

IX.A.7.c. The number of vehicle miles traveled is projected to increase at a rate of 15% in 5 years. This is a little less than 3% per year. NO_x emissions from automobiles are a major source of secondary PM_{10} in all PM_{10} nonattainment areas. To maintain the PM_{10} standard once it is attained, definite maintenance strategies for automobile emissions must be implemented. There are two possible ways to reduce No_x emissions from automobiles. One method is to reduce the number of vehicle miles traveled (VMTs) and the other method is to actually reduce NO_x emissions from automobile exhaust. Below is a list of the strategies that were evaluated in detail by contacting other state, city and county officials, EPA technical support staff, and evaluating published data on the various strategies. Details on each of the proposed strategies are contained in the technical support document.

The Bureau of Air Quality will consider the recommendations made by the Governor's Clean Air Commission and, in coordination with the local health and planning agencies of the counties along the Wasatch Front, select the most promising and effective strategies to reduce travel related air emissions from those listed below. Those selected strategies will be proposed, legislative action sought as needed, and the appropriate rulemaking completed. This effort began during the summer of 1990 with the goal of obtaining initial legislative action during the CY1991 session and will continue during subsequent sessions of the legislature.

(1) POSSIBLE METHODS TO REDUCE VMTS

PARKING MANAGEMENT:
- growth ceilings
- increased parking fees

MASS TRANSIT:
- bus
- light rail system

EMPLOYER-BASED TRAVEL REDUCTION PROGRAMS:

vanpools
flextime
other

NO-DRIVE DAYS:
voluntary
mandatory
only during inversions

BYPASS LANES DURING RUSH HOUR FOR:
bus transit system
carpools
high occupancy vehicles

ENHANCE AND ADVERTIZE THE EXISTING:
bus transit system
ridesharing
park-n-rides
bicycle lanes

IMPROVED LAND-USE PLANNING

GASOLINE RATIONING

(2) POSSIBLE METHODS TO REDUCE NO_x EMISSIONS FROM VEHICLES

ALTERNATIVE FUELS:
implemented for reduction of CO during winter months
many increase NO_x emissions
cng
propane
electric
oxygenated fuels
methanol - ethanol - reformulated gas (mtbe)

REQUIRE USE OF ALTERNATIVE FUELS BY:
public
bus transit system
fleets

IMPROVE TRAFFIC FLOWS:
synchronize lights
maintain continuous flows on interstate

REQUIRE ADDITIONAL NO_x CONTROLS ON VEHICLES:
three-way catalyst converters installed since 1981
retrofitting older cars not feasible

IMPLEMENT NO_x I/M PROGRAM:

additional equipment very costly

NO_x emissions remain constant

IMPLEMENT PROPOSED CLEAN AIR ACT NO_x STANDARD OF 0.4 GPM EARLIER THAN 1993

ADOPT AND IMPLEMENT CALIFORNIA'S PROPOSED NO_x STANDARD OF 0.2 GPM

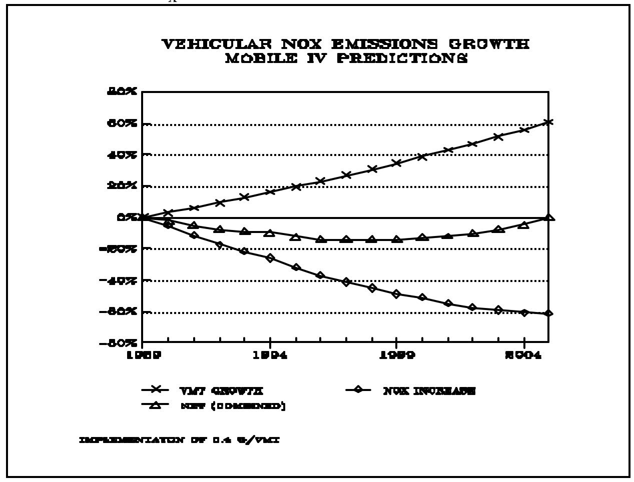


FIGURE IX.A.22

(3) It appears that the following proposed maintenance strategy can be implemented without legislative approval which will furnish considerable reduction credits - the Clean Air Act Amendments of 1990 change the existing 1.0 grams/vehicle mile traveled (g/vmt) No_x standard to 0.4 g/vmt, which represents a 60% reduction in vehicle emissions for light duty vehicles which can be claimed by the state as a reduction credit. This Clean Air Act requires cars manufactured after 1994 to meet the more stringent NO_x standard. With cleaner vehicles replacing older more polluting vehicles at a rate of 4.5% per year improvement should continue through the 18 year replacement cycle (i.e., until the year 2012). If analysis of the program and its impact on vehicular emissions indicates that the required emission reductions are not being realized, then the State will evaluate the options to gain the necessary reduction to meet the standard. Figure IX.A.21 shows the impact this proposal will have on vehicular NO_x emissions in the State.

IX.A.7.d. The Utah Department of Transportation and local planning agencies will be requested to cooperate and to review all proposed construction projects for any impact the proposed construction projects will have on the PM_{10} NAAQS and on the strategies included in this PM_{10} SIP as well as those for Ozone and carbon monoxide. Impacts on PM_{10} concentrations should be reviewed and mitigative steps stipulated as part of the planning process.

IX.A.7.e. EPA has promulgated federal standards for diesel fuel. The standard for sulfur is .05% sulfur content of diesel fuel, and is effective in 1993. This is significantly lower than the 0.43% average sulfur content presently in diesel fuel. A standard of 40 C-tane has also been proposed. The implementation of these programs will result in an additional reduction of PM_{10} emissions from diesel engines and will contribute to maintenance of the PM_{10} NAAQS.

IX.A.7.f. EPA has promulgated a federal emission standard for diesel transit bus engines for 1991 and later engines and for heavy duty (8,500 pounds gross vehicle weight and heavier) truck engines for 1994 and later engines. The new diesel emission standards reduce primary PM_{10} particulate emissions by 80% and will reduce NO_x emissions by 50%.

The normal replacement rate for Utah Transit Authority (UTA) buses is 1/12 of their fleet per year. Since a large purchase of 204 buses was made in 1976 and those buses are wearing out, UTA is planning to replace and purchase a number of buses beginning with a replacement of 112 buses in 1990 and plan to replace more buses in 1993 and more in 1998. Beginning in 1991 the normal bus replacement rate will result in a 7% per year reduction in PM_{10} emissions and a 4% per year reduction in NO_x. Documentation from UTA is contained in the technical support document.

The normal replacement rate for truck tractors in the trucking fleet is 20% per year. Beginning in 1994 the new emission standard will result in a 16% per year reduction in PM_{10} emissions for 5 years. The NO_x emissions from diesel trucks will be reduced 10% per year for 5 years. The reduction in PM_{10} emissions from replacement of bus and heavy duty truck engines will contribute to maintenance of the PM_{10} NAAQS. In addition, UTA is purchasing five compressed natural gas buses to research methods of meeting the PM_{10} emission standard.

IX.A.7.g. Commercial growth should follow population growth at 1.5% per year. Local planning agencies are required to review construction projects to assure that the projects are consistent with the SIP and do not create new problem areas or cause a negative impact on an existing problem. Any identified impacts must be mitigated. Since most of the emissions associated with commercial development is associated with boilers or burners for space heating, the emission offset and low NO_x burner requirements will have to be met.

IX.A.7.h. Projected industrial growth is unknown. The PM_{10} standards will be maintained in the PM_{10} group I areas by implementing the following strategies:

(1) Emissions Capping: All sources in existence at the time of the development of this SIP having existing approval orders have been issued new limitations on the emissions of PM_{10}, SO_2, and NO_x. An upper emissions cap has been established for existing industrial sources located in or impacting PM_{10} nonattainment areas.

(2) Emissions Offset: As the population of the valley grows, there are many small sources of NO_x and other PM_{10} matter which will grow without control (i.e., home space heating, space heating of offices, very small boilers, etc.) As a method of verifying that the emissions invenotory stabilizes, any new or modified source located in or impacting the nonattainment areas which emits 25 tons/year or more but less than 50 tons/year of any combination of PM_{10}, SO_2, or NO_x will be required to obtain a 1:1 emission offset credit as a condition of the approval order from the UACC. New or modified sources located in or impacting the nonattainment area which emit 50 tons/year or more of any combination of these pollutants will be required to obtain a 1.2:1 emission offset credit prior to the issuance of an approval order. The result of the offset requirement is that industrial growth will not increase the cap on industrial emissions and a net reduction occurs when larger industries locate in or near the nonattainment areas.

(3) As a minimum, low NO_x burners or whatever is determined to be BACT at the time of proposed construction or modification are required on all new construction. Whenever burners are replaced, low NO_x burners or whatever is determined to be BACT at the time of replacement are required when the replacement can be installed without significant physical changes having to be made on existing process equipment. The result of this requirement will be that new burners will emit 40% to 60% less NO_x than otherwise would be allowed and a 40% to 60% reduction of NO_x emissions will occur when industrial or commercial burners are replaced. The amount of reduction is dependent on the size of the burner being replaced. In addition, if a new burner emits more than 25 tons/year of NO_x, offset of those emissions must be obtained as a condition of the approval order as required in (b) above.

IX.A.8 CONTINGENCY MEASURES

IX.A.8.a. Attainment Date

In accordance with Section 172(c)(9) of the Clean Air Act, any implementation plan for a nonattainment area must contain contingency measures to be undertaken if the area fails to make reasonable further progress (RFP), or to attain the national primary ambient air quality standard by the applicable attainment date. Such measures are to be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator. Section 172(c)(9) does not specify the number of contingency measures to be adopted or the magnitude of the emission reductions to be achieved.

Both Utah County and Salt Lake County are classified as "moderate" nonattainment areas under Section 107(d) of the Clean Air Act, and therefore the attainment date is December 31, 1994.

Under Section 189(c) of the Clean Air Act, plan revisions demonstrating attainment in PM10 nonattainment areas must contain quantitative milestones which are to be achieved every three years until the area is redesignated to attainment, and which demonstrate reasonable further progress (RFP) toward attainment by the applicable date. Because the starting date for counting the three-year interval was inadvertently omitted from the statute, EPA was left to exercise its discretion and chose as this starting point the due date for the applicable SIP revision. For moderate nonattainment areas this date was November 15, 1991. Thus, the first quantitative milestone deadline for the initial PM10 moderate nonattainment areas is November 15, 1994. The attainment date for initial PM10 moderate areas is December 31, 1994. This de minimis timing differential makes it administratively impracticable to require separate milestone and attainment demonstrations. Thus, the emissions reductions progress made between the SIP submittal due date and the attainment date will satisfy the first quantitative milestone requirement for these areas. The second milestone would occur on November 15, 1997.

To demonstrate attainment, a state must show that the primary standard for PM10 is exceeded no more than three times within a three-year period. Therefore, it is necessary to evaluate the three years preceding the attainment date in order to make such a determination. However, because the statutory due date for implementation of all reasonably available control measures required by the plan revision (CAA Section 189 (a)(C)) is not until December 10, 1993, it would be logical to assume that the three year period used for evaluation (calendar years 1992, 1993 and 1994) would contain only one "clean" year of ambient monitoring data. Therefore, in Section 188(d) EPA has allowed the states to request up to two "extension years" (one at a time) to the attainment date provided that: 1) all SIP measures are in place, 2) in the year preceding the proposed extension year there was no more than one exceedance of the 24-hour standard, and 3) the annual mean concentration for that year was less than or equal to the national standard. This procedure effectively rolls forward the three-year period used to evaluate whether an area has or has not attained the standard, replacing the oldest year with a new year which presumably shows the effect of RACT controls. Therefore, Utah's attainment date may be December 31, 1994, or December 31, 1995 if one extension is granted, or December 31, 1996 if two extensions are granted.

IX.A.8.b. Contingency Measures

A list of possible contingency measures was taken out to scoping meetings in May of 1993. After evaluating the comments received, the list was revised and a draft plan was presented to the Board on

August 19 for public comment (September 15 to October 15, 1993). Further comments led to a second draft that went to the Board on December 9 (and out to public comment from January 1 to 31, 1994). This draft included NOx measures adopted as part of the ozone redesignation request for Salt Lake and Davis counties (including Enhanced I/M or equivalent). Since no such adoption had been made for Utah County, the PM10 contingency plan was split, at this time, into its two airsheds, and the plan for Utah County was withdrawn. The comments received during January of 1994 prompted yet another iteration of the plan which was then presented to the Board on March 30, 1994. The comments collected in the subsequent period of public review then shaped the final plan for Salt Lake/Davis counties. Subsequent revisions to the plan to include Utah County were adopted in July 1995. A more detailed summary of the measures evaluated and the reasons for their inclusion in or exclusion from the contingency plan may be found in the technical support document.

Should the Salt Lake/Davis County PM10 nonattainment area or the Utah County nonattainment area fail to show attainment of the standard by the applicable attainment date or fail to demonstrate reasonable further progress toward attainment of the standard by the applicable attainment date, the contingency measures outlined below will become effective without any further action by the State.

1. Lower the "red" and "yellow" thresholds for woodburning alerts where the PM10 contingency plan has been triggered. The "red" (mandatory no burn) threshold would be lowered from the current 120 $\mu g/m^3$ down to 110 $\mu g/m^3$, and the "yellow" (voluntary no burn) threshold would be lowered from the current 100 $\mu g/m^3$ down to 90 $\mu g/m^3$. DAQ educational information will stress the need to reduce driving on red and yellow days, and DAQ will educate media regarding the need to reduce driving as well as woodburning. DAQ will work with large businesses to encourage carpooling and other methods to reduce driving.

2. In nonattainment areas, ban the sale or installation for use as a solid fuel burning device of previously used solid fuel burning devices which are not certified by EPA.

3. Authority to implement Enhanced I/M or equivalent has been secured at the 1994 legislative session. The State will work with the appropriate Counties to develop and implement an enhanced I/M program or its NOx equivalent as outlined in the schedules found in Section IX.A.8.c.

4. Alternative Commuting Options. The State will implement employer-based trip reduction in a two-phase schedule, the first of which will be part of the Contingency Plan.

Phase I will include implementation of trip reduction programs for all state employees by 1995. This program is implemented by R307-11, Employer-Based Trip Reduction Program, which became effective for Salt Lake and Davis Counties on April 14, 1995, and will be in effect for Utah County by July 31, 1995. The State will assist in implementation of programs at each agency.

Phase II, which will not be part of the Contingency Plan for PM10, will include mandatory trip reduction programs for all large employers (over 100 employees) in Salt Lake and Davis counties. Additional funding for modeling and monitoring for ozone was secured during the 1994 Legislative Session. Phase II will go into effect by May 31, 1998 unless the UAM modeling proves it to be unnecessary. DAQ will work closely with all large employers in Salt Lake and Davis counties to assist them in implementing their mandatory trip reduction programs. Governor Michael Leavitt has, in cooperation with Utah Transit Authority (UTA), sent letters to each large employer in Davis and Salt Lake Counties encouraging them to implement and participate in trip reduction. Legislation authorizing this program was secured at the 1994 Legislative Session. The State has targeted a reduction in VMTs of 20% for all trip reduction programs.

5. Evaluate the oxygenated fuels program. Empirical evidence would suggest a major increase in NOx emissions which has led to a significant increase in nitrates collected on the PM10 filters. Moreover, the reduction of the CO problem may not be as great as was originally expected. The State will continue to analyze the data concerning oxyfuels. If such analysis reveals that the detriments to the PM10 problem convincingly outweigh the benefits for the CO problem, then the State would consider: 1) reducing the oxygenate content (i.e., from 2.7% to 2.0%), 2) requiring a concurrent reduction in the "wintertime" Reid Vapor Pressure of gasoline (which may have an effect on the NOx formation in oxygenated gasoline), or 3) discontinuing the program altogether.

IX.A.8.c. Effectiveness and Implementation Schedules

The anticipated effectiveness of these measures, along with schedules for their implementation, is summarized below. Additional information may be found in the Technical Support Document.

1. Lowering the "red" (mandatory no burn) threshold from the current 120 $\mu g/m^3$ down to 110 $\mu g/m^3$, and lowering the "yellow" (voluntary no burn) threshold from the current 100 $\mu g/m^3$ down to 90 $\mu g/m^3$. Data collected at six different monitoring sites, over the last four to seven years, suggests that lowering the thresholds to the levels identified would have the effect of adding three or four "red" days per year, and five to seven extra "yellow" days. These extra days represent that much less PM10 buildup during periods of air stagnation and will therefore have a significant effect on ambient concentrations, however, EPA will not give the state any credit for this measure because its effectiveness cannot be quantified. Thus, the state will claim no credit for this measure. Rulemaking for this measure has been completed. Enforcement can begin immediately, and will be conducted in the same manner as the existing program.

2. Banning the sale or installation of previously used solid fuel burning devices, which are not certified by EPA, for use as a solid fuel burning device. It is the intention of the DAQ to at least remove from the newspapers any advertisements attempting to sell such a used and uncertified stove. Eliminating the forum through which most of these stoves are typically sold should, in and of itself, reduce the number of these units that are installed for the purpose of home heating along the Wasatch Front. The State is claiming no additional credit in terms of woodburning control for this measure. Rulemaking for this measure has been completed. All major newspapers will be notified as soon as the rule is triggered.

3. Implementing Enhanced I/M or NOx equivalent. EPA has determined that one of the most cost-effective motor vehicle control strategies available for NO_x is enhanced I/M. A significant portion of the NOx inventory is contributed by mobile sources, and to date, very little has been done to control emissions from that source. Salt Lake and Davis Counties are currently designated as non-attainment for ozone, and Salt Lake City and the Provo-Orem area are currently designated as non-attainment for CO. Enhanced I/M would cause significant reductions in NO_x (a precursor to both PM_{10} and ozone) and CO, thereby helping improve the air quality year-round along the Wasatch Front. The implementation of this program in Utah required statutory change. The authority was recently granted at the 1994 Legislative session. The State will now work with the appropriate Counties to develop and implement an enhanced I/M program or its equivalent as outlined in the schedules found in this section. Estimations using the Mobile 5a model indicate that NOx reductions in Salt Lake and Davis Counties

will be on the order of five tons per day in 1996 (the first full year of its effectiveness), and will increase steadily to about eleven tons per day in 2003 (the last year of the maintenance period for the PM10 SIP). In Utah County these reductions are expected to be 1.2 tons per day in 1996, increasing to 2.9 tons per day in 2003. Since these mass emission estimates assume different VMT, emission factors, and even different versions of the Mobile model from those originally used in the PM10 SIP it is difficult to make a valid comparison with the PM10 inventory. However, the percent NOx reduction due to an enhanced I/M program should be about 3% in 1995 and should increase steadily to almost 15% in 2003. NOx reductions projected from 1995 through 2005 are contained in the TSD. The State will proceed with this measure, regardless of whether or not the Contingency Plan for PM10 has been triggered, according to the following schedules of adoption and implementation:

SALT LAKE AND DAVIS COUNTIES MILESTONES	DATE 7/1/95 STARTUP
Enhanced I/M Task Force formed to facilitate program development	Feb 94
Legislature and Governor authorize enhanced I/M	Mar 94
S.L and Davis Counties submit to Executive Secretary a commitment to implement, per this schedule, a combination of automotive emission controls capable of reducing emissions sufficiently to meet the fleet emission factor specifications modeled as technical support for this document.	July 31, '94
County Enhanced I/M or equivalent automotive emission control program rulemaking complete	Jan 95
State rulemaking for Enhanced I/M or equivalent automotive emission control program complete	Feb 95]
Request for Proposal (RFP) and/or specifications released, as applicable	Feb 95
Submit Enhanced I/M or equivalent automotive emission control SIP to EPA	Feb 95
Bids submitted to counties, as applicable	Mar 95
Contracts awarded, as applicable	Apr 95
Updated analyzers received for certification, if applicable	May 95
Buildings, equipment, software, etc., complete	June 95
Certification complete, Enhanced I/M or equivalent automotive emission control program begins operation	July 95

UTAH COUNTY MILESTONES	DATE
County enhanced I/M or equivalent automotive emission control program rulemaking complete	June 95
Submit Enhanced I/M or equivalent automotive emission control SIP to EPA	Dec 95
Certification complete, enhanced I/M or equivalent automotive emission control program begins operation	Jan 1, 96

4. Phase I of Alternative Commuting Options (ACOs). The goal of Employer-based Trip Reduction (ETR) Programs is to introduce and implement strategies designed to reduce the amount of measurable miles driven by employees commuting to and from work. The result would be heightened awareness of the direct relationship between driving and air pollution, and a reduction in the amount of vehicle-related pollution. A trip reduction program is being implemented during 1995 in Salt Lake and Davis Counties by the Division of Air Quality, under authority of R307-11, Employer-Based Trip Reduction Program. The program will be implemented in Utah County within 60 days after being triggered by the conditions specified in Section IX.A.8.b. The Wasatch Front Regional Council prepared estimates for emission reductions that could be obtained by implementing Trip Reduction Programs with the following groups of employers:

Utah County:

Phase I: All State Government Employees (4542): 0.03 Tons/Day
All Federal Government Employees (889): 0.006 Tons/Day(does not include contractors)
All Local Govenrment Employees (10,854): 0.07 Tons/Day (includes schools)

Salt Lake & Davis Counties:

Phase I: All State Government Employees (28,152): 0.18 Tons/Day (includes schools)

Phase II: All Federal Govt. Employees (18,496): 0.12 Tons/Day (does not include contractors)
All Local Govt. Employees (37,997): 0.25 Tons/Day (includes schools)
All Large Employers--over 100 employees (189,431): 1.23 Tons/Day

The State will target a reduction in VMTs of 20% for all trip reduction programs. Following is a list of strategies that may be used for reducing VMTs:

I. Mass Transit
  1. Subsidized Bus Passes
  2. Worker Service/Express Bus
  3. Regular Bus Service

II. Vanpool/Carpool Programs
  1. No-Interest Vanpool Program
  2. Vanpool Leasing Program
  3. State Motor Pool Vanpool

4. Ridesharing

III. Telecommuting

IV. Compressed Work Week/Flexible Work Schedule

V. Worksite Parking Fees

An important component of the above strategies is for workplaces to begin charging employees who drive alone for parking. Some studies have shown that emission reductions from mandatory trip reduction programs combined with parking fees at the worksite have been as high as 10% (reference: Barbara Austin, SAI).

VI. Transportation for Business-Related Activities

VII. On-Site Facility Improvement

VIII. Bicycling/Walking

The State will proceed with Phase I of this measure, regardless of whether or not the Contingency Plan for PM10 has been triggered. Legislation authorizing Phase II of this program was secured at the 1994 Legislative Session, as was funding for UAM modeling and additional monitoring for ozone. Phase II will go into effect in Salt Lake and Davis Counties by May 31, 1998 unless the UAM modeling proves it to be unnecessary.

5. Evaluate the oxygenated fuels program. Although this item does not exactly meet the requirements of a contingency measure, the provisions in the CAA for a waiver based on the infringement on the success of another SIP suggest that this issue at least be given some consideration in the event that the PM10 SIP should fail. For this reason alone, the DAQ will recommend that this remain a part of the Contingency Plan.

In closing, as mentioned above, Enhanced I/M or NOx equivalent and the Alternative Commuting Options are both measures which will be implemented regardless of whether the PM10 Contingency Plan is actually triggered. The steps necessary for implementation of these measures will begin immediately. Enhanced I/M or equivalent will be effective in Salt Lake and Davis Counties by July 1, 1995, and by January 1, 1996, in Utah County. Phase I of the Alternative Commuting Options will be in place by 1995. These two measures would thus be contributing to the improvement of air quality during the last half of the '95/'96 PM10 season, which is the earliest any of the contingency measures might be required. Therefore, the State feels that these measures do in fact qualify as legitimate contingency measures.

The measures identified in this plan also constitute, in the State's opinion, the application of the best available control to motorized vehicles, which despite contributing such a large share of the emissions were left essentially uncontrolled by the PM10 SIP as it was originally written. Coupled with increased control over the woodburning emissions and an already effective program for curtailing emissions from industry, the State now feels that it has required a substantial degree of control from all sources within the Utah County and Salt Lake/Davis County airsheds.

IX.A.9 ANNUAL AVERAGE

DEMONSTRATION OF ATTAINMENT OF THE ANNUAL AVERAGE

In addition to demonstrating that the 24 Hr. average attains the NAAQS, the SIP must also demonstrate that the annual arithmetic mean meets the NAAQS of 50 $\mu g/m^3$.

Utah County

The highest annual average PM_{10} concentration over the past two years in Utah County is 54 $\mu g/m^3$ for 1988 at Lindon. This results in a required reduction of the annual average of 7.4% in Utah County. On page 6-1, the "PM_{10} SIP Development Guideline" states:

> "The SIP-related emission limits should be based on the NAAQS (annual or 24-hour) which result in the most stringent control requirements. For example, if the annual NAAQS requires more stringent control requirements than the 24-hour NAAQS, the annual NAAQS is considered the more restrictive standard and the corresponding emission limit(s) would be adopted."

Since the 24-hour design values result in a reduction of 43% in Utah County, the 24-hour emission limits are the more restrictive.

The application of many of the control strategies that are being implemented to reduce the 24-hour PM_{10} concentrations will also result in a reduction of the annual PM_{10} concentrations even though they are designed to reduce winter time 24-hour concentrations. Table 9.A.24 shows that the winter season is the period that has the greatest impact on the annual average and controlling PM_{10} concentrations during the winter will have the greatest impact on the annual average.

In Utah County the control strategies will reduce the winter time 24 Hr. PM_{10} concentrations by 43%. Those strategies implement control measures which will reduce PM_{10} concentrations through out the entire year by 23.9%. The highest annual average PM_{10} concentration over the past two years in Utah County is 54 $\mu g/m^3$. A 23.9% reduction in 54 $\mu g/m^3$ is 13 $\mu g/m^3$. Based on the control stratigies developed to reduce the 24 Hr. PM_{10} concentrations, it is anticipated that the annual average PM_{10} concentration in Utah County will be reduced to 41 $\mu g/m^3$ which is well below the NAAQS of 50 $\mu g/m^3$.

1988 (NON-WINTER)	LINDON	WEST OREM	NORTH PROVO
MAR	31		22
APRIL	35		24
MAY	32		31
JUNE	41		25
JULY	47		46
AUG	39		35
SEPT	49		36
OCT	47	34	30
AVG NON-WINTER	40.1		31.1

1988 (WINTER)	LINDON	WEST OREM	NORTH PROVO
JAN	103		75
FEB	98		80
NOV	32	31	23
DEC	96	81	89
AVG WINTER	82.3	56.0	66.8
ANNUAL AVG	54	54	50

1989 (NON-WINTER)			
MAR	39	40	40
APRIL	31	34	29
MAY	32	34	30
JUNE	27	28	29
JULY	39	35	28
AUG	35	29	28
SEPT	35	31	34
OCT	31	29	27
AVG NON-WINTER	33.6	32.5	30.6

1989 (WINTER)			
JAN	119	117	109
FEB	116	122	62
NOV	52	51	42
DEC	75	73	61
AVG WINTER	90.5	90.8	68.5
ANNUAL AVG	52	49	44

Table IX.A.24

Salt Lake - Davis Counties

The highest annual average PM_{10} concentration over the past two years in the Salt Lake - Davis County area is 56 μg/m^3 for October, 1988, through September, 1989, at the North Salt Lake monitor. This results in a required reduction of the annual average of 10.7 % in Salt Lake County. As stated above, the "PM_{10} SIP Development Guideline" states:

> "The SIP-related emission limits should be based on the NAAQS (annual or 24-hour) which result in the most stringent control requirements. For example, if the annual NAAQS requires more stringent control requirements than the 24-hour NAAQS, the annual NAAQS is considered the more restrictive standard and the corresponding emission limit(s) would be adopted."

Since the 24-hour design values result in a reduction of 19.6% in the Salt Lake - Davis County area, the 24-hour emission limits are the more restrictive.

The application of many of the control strategies that are being implemented to reduce the 24-hour PM_{10} concentrations will also result in a reduction of the annual PM_{10} concentrations even though they are designed to reduce winter time 24-hour concentrations. Table IX.A.25 shows that the winter season is the period that has the greatest impact on the annual average and controlling PM_{10} concentrations during the winter will have the greatest impact on the annual average.

As shown in Tables IX.A.17, IX.A.18, and IX.A.19 (attainment demonstration, AMC), the control strategies that will be implemented in Salt Lake County will reduce the winter time 24 Hr. PM_{10} concentrations by 19.6%. Those strategies implement control measures which will reduce PM_{10} concentrations throughout the entire year by 16.9 to 18.6%. The control measures identified in the SIP to reduce 24-hour PM_{10} concentrations during the winter will result in a reduction of 22.5 g/m^3 in the annual average, and result in a predicted annual average of 33.5 g/m^3 (56-22.5). Additional control requirements have been put into place which will reduce PM_{10} emissions from industrial sources that operate only during the summer. Those controls include a reduced opacity limit on combustion and process sources, increased watering and control requirements on stockpiles and fugitive dust sources and a higher moisture content in process material. In addition more restrictive emission limits have been placed on SO_2 and NO_2 emissions from asphalt batch plants in the North Salt Lake and Beck Street areas which are very near the North Salt Lake PM_{10} monitoring station. Those summer controls in conjunction with the winter control measures for PM_{10} will result in an annual average below the annual NAAQS of 50 μg/m^3.

1988 (NON-WINTER)	AMC	NSL	SLC	CW	MG
MAR	35	32	34		
APRIL	42	25	42		
MAY	44	30	31		
JUNE	49	38	36		
JULY	51	36	39	45	
AUG	53	36	39	40	
SEPT	56	57	39	39	
OCT	66	46	28	31	
AVG NON-WINTER	49.5	38.6	36.0	37.2	
1988 (WINTER)					
JAN	69	72	43		
FEB	70	66	50		
NOV	34	31	25	19	
DEC	80	79	77	48	
AVG WINTER	63.3	62.0	51.0	40.0	
ANNUAL AVG	54	49	41	38	

1989 (NON-WINTER)					
	AMC	NSL	SLC	CW	MG
MAR	51	43	34	34	25
APRIL	32	46	26	29	24
MAY	33	42	26	28	21
JUNE	27	29	26	36	19
JULY	37	51	32	41	29
AUG	37	47	26	44	25
SEPT	37	54	31		29
OCT	36	58	29		25
AVERAGE OF NON-WINTER MONTHS	36.3	46.2	28.8	35.3	24.6
1989 (WINTER)					
JAN	91	75	99	105	47
FEB	100	79	83	68	56
NOV	59	64	42		34
DEC	83	80	78	87	47
AVG (WINTER)	83.3	74.5	75.5	86.6	46.0
ANNUAL AVG	51	56	41	55	31

1990 (NON-WINTER)					
	AMC	NSL	SLC	CW	MG
MAR	33	36	25	27	21
APRIL	26	35	20	20	20
MAY	29	35	21	21	16
JUNE	31	40	22	22	20
JULY	35	46	26	45	25
AUGUST	35	53	33	40	29
SEPTEMBER	31	49	28	39	24
AVG NON-WINTER	31.4	42.0	25.0	25.6	22.1
1990 (WINTER)					
JAN	55	55	42	37	29
FEB	50	39	43	28	
AVG WINTER	52.5	52.5	40.5	40.0	28.5

Table IX.A.25